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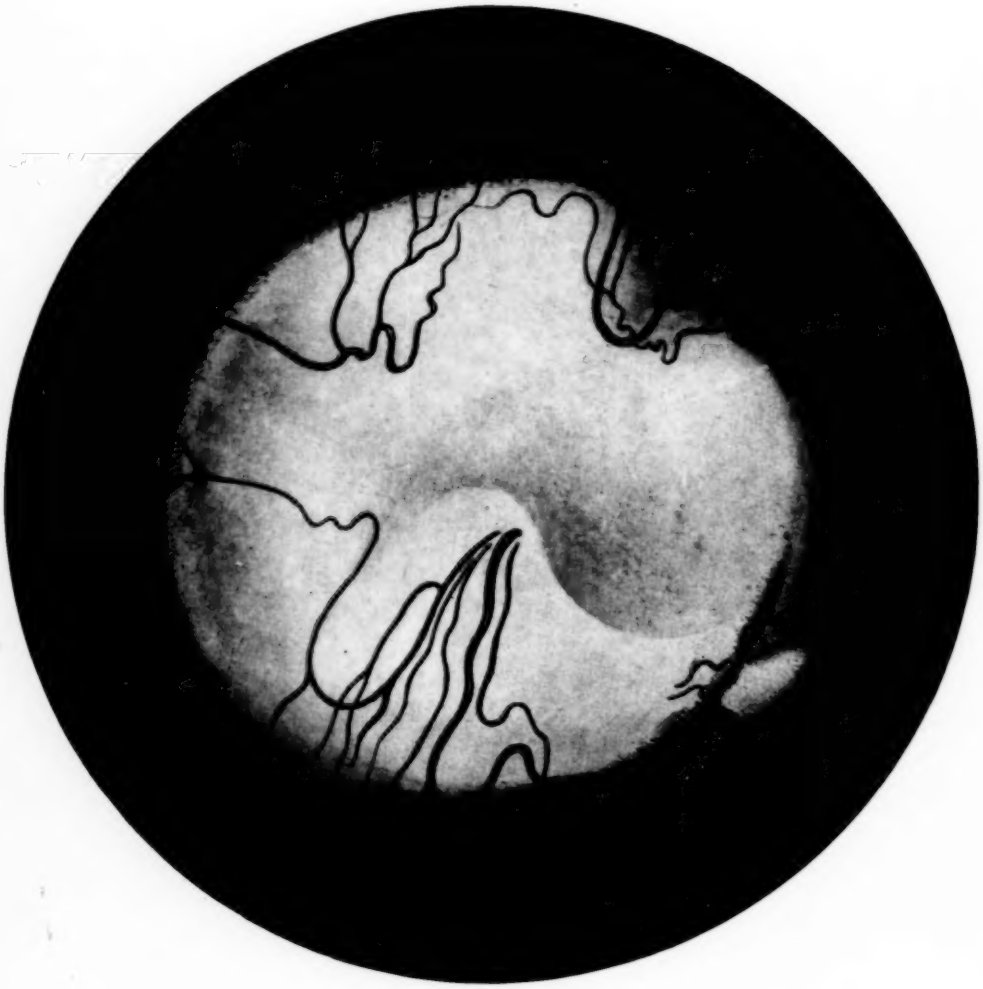

COLOBOMA OF OPTIC NERVE, CHOROID AND RETINA. (LERNER'S CASE)

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COLOBOMA OF THE OPTIC NERVE.

MACY L. LERNER, M.D.

ROCHESTER, N. Y.

A case here reported presented most of the characteristics of coloboma of the optic nervehead. The eye was microphthalmic and had always been blind. Hypotheses as to the pathogenesis of such defects are discussed.

Coloboma of the optic nerve is considered a very uncommon congenital anomaly. According to Vossius it is met in three out of 12,000 patients. Up to 1891 Saemisch collected the total cases reported in literature up to 48. There have been reported a good many since. In this country typical cases of coloboma of the optic nerve alone, were reported by Crampton, Chance, Jennings and others. The most recent case is by J. E. Jennings, where the field of vision was found normal and the blind spot extended from the point of fixation 20° outward. Crampton's cases were very interesting because they were binocular and in the same family. He describes "the papilla as being 2½ times the size of a normal disc and the depth of the gray looking cavity was explored with a —18 lens". His second case was a sister of his first patient who also had binocular colobomata and of considerable depth, the vessels around the pseudodisc of the cilioretinal type. M. Danis reported and illustrated several cases of colobomata of the entrance of the optic nerve.

CASE REPORT: J. D., male, aged 14. Italian, school boy. Family history negative. Personal History: He was twice a patient at the County Tuberculosis Sanatorium where he was studied very carefully to determine whether his lung infection was tuberculous. Numerous sputum examinations, including tuberculin tests and injection of his sputum into guinea pigs, were done and all proved negative. He was then discharged with a diagnosis of a basal lung infection nontuberculous in character. He also gives a history of nose bleed and a bad hemorrhage following the extraction of a tooth. The coagulation time of his blood was reported by the laboratory as 5½ min.

Ocular history: He has had no vision in the left eye since birth. He presented himself to the eye Outpatient Department of the General Hospital Dec. 12, 1924, complaining of headaches, poor vision and strain in the right eye. Upon examination the vision in the right eye was found to be $6/12 + 4$, while the left eye had only light perception and light projection at one foot. Right globe appeared normal in every way, while the left one was considerably smaller, about ⅓ the size of the right one. Cornea was very small, pupil round and active. No defects were present in the lids, iris or lens. A very slight horizontal nystagmus could be demonstrated only when the patient was directed to look to the extreme right or left. The eyeball, on account of its smallness, appeared to be hidden by the upper lid and gave an impression of an existing ptosis and internal strabismus. Upon careful examination neither of these conditions could be demonstrated.

Ophthalmoscopy: O. D. Media were clear, disc slightly oval vertically, well outlined and of good color. Vessels appeared normal and no lesions were observed in the macula or periphery. Slight hyperopia noted.

O. S. Media were clear, disc appeared considerably enlarged, many times the size of the normal, a deep white excavation was observed in the lower portion of the fundus; while temporally and above, the entire area appeared gray white with varying shadings. The superior retinal ves-

sels were arranged mostly in loop formation and around the edge of the pseudodisc, while the inferior ones appeared to emerge from the center of the white area. The artery looped toward the periphery in an irregular manner while the veins assumed a fairly normal course.

I am under the impression that the superior vessels are probably of the cilioretinal type, while the inferior one is maybe a true retinal vessel.

The colobomatous area as illustrated appears to occupy the greater portion of the fundus and therefore should not be considered a coloboma of the nerve alone, but one that includes the choroid. The white area below is probably the choroidal defect.

Anatomic studies of coloboma of the disc show that the choroid and pigment epithelium are absent in the great enlargement of the foramen sclerae. Connective tissue takes their place. Retinal elements and nerve fibers are present. In the walls cystic spaces may be found.

PATHOGENESIS OF COLOBOMATA.

Because of the relatively extreme frequency of typical inferior colobomata, the theory is that some interference with the normal closure of the fetal cleft must exist. This theory was propounded first by v. Ammon in 1831, and v. Hippel confirmed this view in experimental research.

Deutschmann in 1881 suggested the inflammatory theory, believing that intrauterine inflammation may be the cause.

Fournier believed that toxic effects of the tubercle, alcohol and syphilis may be responsible in causing colobomata. Of all these theories v. Ammon's is considered by most ophthalmologists as the most probable one. The following is the explanation of the theory: The fetal ocular cleft usually closes early in fetal life, cutting off the mesoblastic structures external to the secondary optic vesicle from those internal to it. Occasionally in man a union is found to have persisted between the tissues external to the retina and the vitreous humor. Such a union prevents the edges of the secondary optic vesicle coming together and a gap or coloboma in the retina results. Eyes with this form of coloboma and atypically developed vitreous usually do not expand to the full extent and are microphthalmic.

A delay in separation of the external and internal mesoblast without permanent union may also result in the failure in the closure of the cleft in the secondary optic vesicle and the formation of a coloboma. If the defective closure is in the extreme posterior part of the cleft, then we have a coloboma of the optic nerve sheath; if further forward a coloboma of the choroid results.

The main points of v. Ammon's theory are the following:

(1) Defective closure of the fetal cleft.
(2) Abnormal development of the surrounding mesoblast, the precursor of choroid and sclera.
(3) Ectasia of the cicatricial tissue under the influence of the intraocular pressure.

My patient shows two anomalies: (1) the microphthalmos, (2) colobomatous area of the nerve, including considerable portion of the choroid. The second anomaly is estimated to be found in 20% of microphthalmic eyes.

Most of the characteristics of a coloboma of the optic nerve, namely: increase in size and shape of disc, the ectasia of the surface, the depth and the striking whiteness, type of vessels and their special arrangement, seem to be present in this case.

332 Park Avenue.

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TUBERCULOSIS OF THE EYE.

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NEW YORK CITY.

The various manifestations of tuberculosis in different parts of the eyeball and its adnexa are here briefly described. The different tuberculins in common use are compared, and their use for diagnosis discussed. Tuberculin treatment and its results is also noticed. Read before the Colorado Congress of Ophthalmology and Oto-Laryngology, August, 1925.

Tuberculosis of the eyelids presents externally as lupus erythematosus, lupus vulgaris and cold abscess. The last in connection with tuberculosis of the margin of the orbit and periosteum. The affection is apparently exogenous in the first two, endogenous in the last.

Tuberculosis of the conjunctiva presents in at least four forms. 1st, Lupus vulgaris, usually in connection with lupus of the skin of the lids, but not always so; characterized by superficial, irregular ulcers with a greyish base, ragged, slightly raised borders; on the palpebral conjunctiva, principally. May be monocular or binocular. Progresses very slowly without much pain. Some shreddy mucopurulent secretion. Tendency to spread slowly.

Lupus erythematosus, characterized by lesions resembling those of the same disease affecting the skin. Exogenous infection.

Acute miliary tuberculosis, characterized by hyperemia in the vicinity of the development of the miliary tubercles. The gradual development of miliary tubercles over much of the ocular and palpebral conjunctiva, usually following a penetrating wound of the conjunctiva, the first tubercles appearing from ten days to three weeks after the injury. Some mucopurulent discharge. Eyelids slightly swollen. Preauricular and cervical glands on the affected side enlarged. They may suppurate. Monocular. Runs a course of six months to two years, and gradually subsides, ordinarily. May result in a serious involvement of other parts of the body. Eye red. Photophobia. Some pain.

Tuberculosis resulting in a thickening of the palpebral conjunctiva principally. Little or no roughness. No ulceration. Usually monocular. Rare. Very few symptoms, except some ptosis and a very little mucoid secretion. Infection probably exogenous.

Cornea. Tuberculous affections of the cornea are characterized by infiltration, opacification, with small, dense areas in places. Roughened epithelium above the infiltration, particularly over the denser areas. Moderate vascularity in the more active cases. The process frequently extends beyond the limbus into sclera and ocular conjunctiva. Moderate pain and photophobia. May resemble atypical dendritic keratitis. The infection may be exogenous or endogenous. When endogenous the condition usually extends from the ciliary zone into the cornea. Occcurs in children and young adults. In some cases there is quite a marked resemblance to the socalled phlyctenular keratitis.

Iris. Tuberculosis of the iris occurs as miliary tuberculosis and as conglobate tuberculosis, affecting children and young adults principally. Miliary tuberculosis is frequently binocular. It is characterized by greyish, slightly raised nodules, few or many in number, on iris tissue that is little changed in appearance at the onset, except some increased vascularity at the bases of the nodules. The nodules appear in the major and minor zones of the iris, having no selective tendency for either, in contradistinction to papillary syphilides which always appear in the minor zone of the iris. If exudation is present it is in the form of a densely white flaky or "mutton fat" exudate. The conglobate tubercle occurs most commonly in the major zone of the iris, not infrequently in connection with a tuberculous mass in the ciliary body. The mass is pale, situated on a slightly hyperemic base. Some flakes of exudation of the "mutton fat" variety may be present.

In miliary tuberculosis there is usually some photophobia and some injection of the ocular conjunctiva. In conglobate tuberculosis these symptoms may be present, but in a lesser degree.

Ciliary body. Tuberculosis of the ciliary body undoubtedly occurs in the form of miliary, as well as conglobate tuberculosis, but miliary tuberculosis cannot be positively diagnosed. The conglobate form occurs as a greyish irregular mass, with little vascularity, except at the base, developing slowly. It may attain to large proportions, invading sclera, cornea and iris. The treatment is enucleation.

Choroid. Occurs as miliary and as conglobate tuberculosis. Miliary tubercles may occur singly, or the tubercle may be numerous and scattered over the fundus. They may affect one or both eyes. The infection is endogenous. Conglobate tuberculosis of the choroid seldom affects both eyes, and is seldom multiple. The development of tuberculosis of the choroid is seldom accompanied by pain. In miliary tuberculosis there may be some hyperemia of the ocular conjunctiva, general in miliary tuberculosis; somewhat localized in conglobate tuberculosis. The attention of the patient is directed to the condition by impairment of vision. Ophthalmoscopically the miliary tubercle first presents a small pale circular or oval area ¼ to ⅓ the diameter of the disc, and often there is a haziness of the vitreous body immediately over it. As the process advances there is an increase in the haziness of the vitreous body and there may be a few small retinal hemorrhages. The retinal and choroidal pigmentation at the margin of the tuberculous patch is disturbed. When recovery takes place there remains an atrophic patch in the choroid, irregular in shape, pale in the center, surrounded by an irregular pigmented zone, and at the site of the miliary tubercle a circular or oval patch quite pathognomonic of this condition. The diameter of this irregular atrophic patch is usually about that of the disc.

The conglobate tubercle may invade the ciliary body, iris and sclera. On transillumination the mass gives a shadow. A differential diagnosis between tubercle and leucosarcoma, or glioma, should be made if the mass is small. If large it is of no particular consequence, before the specimen reaches the laboratory, as enucleation should be done in any event. If the tubercle is quite small treatment may cause it to disappear. If there is no extensive active tuberculous process taking place in the patient, a therapeutic course of tuberculin should be given as soon as a positive diagnosis is made if the mass is small.

Tuberculosis of the *retina* and *optic nerve* may manifest itself as a diffuse tuberculous process, or as a conglobate mass, usually monocular. The most frequent site is at the optic nerve entrance, and a frequent accompaniment is a very white, fleecy or flaky exudation. The diagnosis is made by excluding syphilis and by the production of a reaction by the subcutaneous injection of diagnostic doses of tuberculin; also by the effect of a therapeutic course of tuberculin in cases of difficult diagnosis.

TUBERCULINS.

The principal tuberculins are the following: 1st, Koch's Original Tuberculin "T.O." This is a filtrate of an emulsion of bouillon cultures of tubercle bacilli, containing the products of the growth of the bacilli, substances extracted from the bacilli and the unaffected constituents of the bouillon. In process of preparation the tuberculin is exposed to a temperature of 70° to 80° C. As it usually appears on the market, one c. c. is supposed to contain 1 mg. of the tuberculin. (Mulford has put on the market serial dilutions of the principal tuberculins which greatly facilitate the administration of the tuberculins.)

2nd, Koch's New Tuberculin (T.R.) This is a centrifugalized extract of dried and ground tubercle bacilli. The sediment obtained by centrifugalizing is dried and reground, and dissolved in glycerin and water (1 c. c. = 1 mg. of the dried sediment or extract.)

3rd, Bacillus Emulsion (B.E.) The bacilli are washed between sterile sheets of filter paper and dried. They are then ground in a mortar until no whole bacilli are found on staining. The powder is taken up in 8% salt

solution and added to 5% glycerin solution, so that 1 mg. of the powder is contained in 0.2 c. c. of the final preparation.

4th, Bouillon Filtrate (B.F.) (Denys.) This is the unheated filtrate of bouillon cultures of human tubercle bacilli.

Of the tuberculins mentioned, "T.O." is thought to have but little therapeutic value because it has been subjected to heat (70-80 C.). However, experience has taught that this tuberculin is of much value therapeutically in many cases in which it has been employed, often producing good results, when T.R. and B.E. have been unsatisfactory.

DIAGNOSIS.

A differential diagnosis must, of course, be made. Syphilis, ophthalmia nodosa, malignant and benign neoplasms must be considered. It must be borne in mind that syphilis and tuberculosis exist together not very infrequently. Their separate presence should be determined.

The diagnosis of lid, conjunctiva and sometimes of corneal and scleral tuberculosis, can sometimes be made by the removal of a small piece of involved tissue, sectioning, staining and examining by means of the microscope, but these cases are rare. The tubercle bacilli are often so few and so scattered that it is difficult or impossible to discover them. A fresh piece of the tissue may be introduced into the anterior chamber of a rabbit's eye; when, if tubercle bacilli are present, tuberculosis of the iris will be produced in about three weeks' time.

Since it is often impossible to make a diagnosis of ocular tuberculosis by means of the microscope, ophthalmoscope or history of the case, it is necessary to resort to the well known tuberculin reaction tests. Tests that produce a reaction at the site (focal reaction) of the eye lesion are the only positive tests. To obtain a positive test we must rely upon the subcutaneous injection of tuberculin. The reaction from the intradermal and Calmette tests is purely local. The von Pirquet test is local unless a considerable quantity of tuberculin is introduced into the inoculation wound when it may become general. This, however, is not the design of the test. The intradermal, von Pirquet and Calmette tests are valuable, as a means of determining tuberculosis in some part of the body. But as eye lesions that are not tuberculous are often present in tuberculous subjects, this information regarding the eye is of no value.

The method of procedure employed by the writer in adults is, briefly, as follows: Temperature determined for two days, twice or three times daily. If there is no fever injections of tuberculin, "T. O.," 0.5 mg. subcutaneously, in arm, abdomen or subscapular region. The typical reaction usually begins in 6 to 12 hours. Consequently it is best to give the injection either very early in the morning or late at night. The temperature should be taken every two, or at most three, hours, for sixty hours. If no reaction occurs 2 mg. may be given three days later, and the temperature taken as before. The eye lesion should be examined, beginning 12 or 24 hours after the injection, often enough to determine whether or not a local reaction has been excited, manifested by an increase in hyperemia and exudation, and sometimes by subjective symptoms. If no reaction follows the injection of 2 mg., a third dose of 3 to 4 mg. may be injected. If the case is tuberculous a systemic reaction and a reaction at the site of the lesion will generally be produced, but in some cases even a larger dose may be required. It must be borne in mind that a general reaction occurs in healthy individuals by injection of 8 to 10 mg. of "T. O."

TREATMENT.

The treatment of conglobate tubercle is removal. When it occurs in the eyeball, enucleation must be resorted to. Accompanying abnormal systemic conditions must receive proper attention, and may require treatment at the same time that treatment for correction of the tuberculous manifestation is being conducted.

If an extensive active tuberculous process is taking place in other tis-

sues of the body, treatment of the eye condition by means of tuberculins may be harmful to the system in general; apparently because the power to produce antibodies by the tissues has already been exhausted and an anaphylactic condition produced. If there are but small tuberculous processes present, and these inactive, then the tuberculins appear to possess much value.

In regard to the therapeutic value of the various tuberculins, the writer has obtained more good results from the use of old tuberculin "T. O.," notwithstanding the fact that it is subjected to heat in its preparation. T.R. and B.E. are also valuable. The initial dose should be small—of T.O. 1/200 to 1/100 mg.; of T.R. and B.E. 1/1000 mg., and the dose may be doubled at each injection until some signs of systemic reaction are induced in the patient. The dose is then reduced to a point where no systemic reaction is induced by the injection, and there held for a period of time, when the dose may be again increased to the point of reaction and the plan of treatment repeated. The tuberculin should be given every three to five days, and should be continued six to twelve weeks after all signs of activity in the process have ceased. It must be remembered that tuberculins are sometimes inert, and that in view of this it is desirable to change to other tuberculins, in a given case, if the expected results are not being obtained.

RESULTS.

In 1910 the writer reported 56 cases of tuberculosis of the eye treated by the use of tuberculins in which there were 35 recoveries and improvement in 15 cases. In one case removal of the globe was necessary. Since 1910 the number of cases treated has made a total of 100 at least. Altho I have not analyzed the cases since 1910, I am of the opinion that the results have been equally as good as they were before that date.

Recurrences. Even after using great precaution in the treatment of tuberculosis of the eye, recurrences may take place. In the writer's experience recurrence is more common in bulbar tuberculosis than in tuberculosis affecting the eyelids. Recurrence in tuberculosis of the cornea has been about as frequent as recurrence in tuberculosis of the uveal tract.

Spontaneous recovery from miliary tuberculosis of the iris and choroid has been observed from time to time, particularly in the pretuberculin days.

20 E. 53rd Street.

THE FUSION FACULTY AND SOME OF ITS ANOMALIES.

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The fusion faculty is little needed or developed in most lower animals. In the carnivora and those that dwell in trees accurate judgment of distance is important, the eyes turn forward so that the fields of vision overlap and binocular fusion develops, with the necessary mechanism for securing it, including the fibers connecting the eye and various visual centers; and these in turn with the motor apparatus. Points not on the horopter impressing points of the retina not identical give the sense of depth. Differences of light and color falling on corresponding points of the two eyes lead to rivalry of the two retinal fields, and specially interpretation of impressions. Suppression of one retinal image is learned when it serves to help the individual's visual needs. Read before the Chicago Ophthalmological Society, October 19, 1925. (See p. 291)

To aid us in understanding what the fusion faculty is and does, let us glance at its development. The chief function of the eyes in most of the lower vertebrates is to warn the animal of danger. For finding food and judging of its fitness, they may rely on other senses such as smell and touch. Thus, for their eyes a large field of vision is most important—what has well been called "panoramic vision." With an eye on each side of the head, each with a field of 180°, the animal would be protected in all directions, with minimum movement of his eyes or head. His need is a vision quick to detect movements, or change in the environment, in every direction, rather than ability to perceive fine details in any one direction; in short, the kind of vision we have in our own visual fields outside the central macular area.

It would be unlikely that the two eyes would be so placed that their fields just touched without overlapping. In most cases there would be some overlapping. In this part of the field an object would be seen with both eyes at once. How would that be taken care of? Would it not cause diplopia? The answer is that it might be taken care of just as it is in our own eyes. We see all points double in the visual field except the limited number that form the horopter. This group of points which constitutes the horopter changes with every change of fixation, and the majority of points of the field are outside the horopter and therefore are seen double—physiologic diplopia. This never gives any trouble, except perhaps in a neurotic individual who accidentally discovers it and is alarmed and greatly distressed thereby.

The case is somewhat different in the lower animals, who have no macula to dominate the field of vision. With all points of the field on a par, it might be argued that diplopia would be more inevitable. Even if this were true, we have the very general principle of suppression or inhibition to fall back upon. As examples of this kind of inhibition, take the sense of touch. We have messages coming to the sensorium constantly from all parts of the body, but we ignore most of them, concentrating attention on what is, for the time being, important. Or take the sense of hearing. Amid a medley of sounds, we can single out those to which we wish to give attention, suppressing the others. There is at all times a veritable shower of messages coming to the sensorium. It is necessary only to suppress or inhibit the sensation from one eye to eliminate diplopia. This faculty of suppression is doubtless exercised continually by these lower animals. When anything in the field of vision attracts our attention, we turn the eyes so that the image falls on the macula. Not so these lower animals. They have no macula. They simply concentrate their attention on what is happening in the part of the field concerned, while the rest of the field of both eyes is subordinated for the time being. We must conceive of the power of suppression as a fundamental one for the vertebrate eye. The importance of this is obvious to the student of squint.

As we go forward in the scale of development, we have time to touch on two groups, the carnivorous and the arboreal. In the carnivora, taken merely as an example, we have ani-

mals who find use for their eyes, not simply as warning of danger, but as aiding in securing their prey. They have use for a type of vision which will give accurate and quick information as to location of the prey, including distance as well as direction. More information as to detail would obviously be useful to them. Still more is it true of the arboreal types that they need quick and accurate judgment in swinging from limb to limb, and more ability to detect detail in finding their food. Thus we find a new faculty, that of judging the distance of near objects by stereoscopic vision. For this the eyes have to be located side by side, with most of the visual field common to both eyes, and with a portion of the retina more highly differentiated to give macular vision. The eyes require greater mobility, and this is further supplemented by the greater mobility of the head, which can turn the eyes in any direction desired in a manner impossible with the lower vertebrates—fish, for example.

This brings us to the problem of fusion. The two eyes no longer act independently. Vision becomes binocular. For the successful achievement of the highest type of binocular stereoscopic vision, there are several difficulties to be overcome. If we try to enumerate some of them and see why they need to be provided for, we shall be able to understand better some of the anomalies of the fusion faculty which we are supposed to be considering.

In the first place, with two eyes, each with a macula well developed, it becomes necessary to have provision made for binocular fixation. We must be able to fix both eyes simultaneously and quickly with great precision on the point to which our attention is directed. This is the function of the extrinsic ocular muscles and their controlling nervous apparatus.

It is an exceedingly complicated problem which this mechanism has to solve, to maintain accurate fixation of both eyes on the incessantly changing fixation point, for it is characteristic of eyes with macular vision that when they look at an object they fix one point after another of the object, the gaze incessantly roaming from point to point as its different parts are subjected to scrutiny. Now these movements have to be coordinated to the nth degree of accuracy and speed. This is one of the fundamental requisites for fusion, and it is the one which most frequently engages our attention as ophthalmic surgeons in our work of helping people to see better and with greater comfort.

The mechanism for securing these coordinated ocular movements includes the sensory arc, from the retina via the optic nerves to the motor nerve cells; and the motor arc, from the motor nerve cells via the third, fourth and sixth nerves to the extrinsic ocular muscles. The sensory part is relatively simple; the muscular part is relatively simple; the coordinating work of the motor nerve cells and their connecting paths is the complicated and most easily disturbed portion of the machine. One must picture to himself these motor nerve cells receiving impulses from the sensory nerves of the eyes and also of other parts of the body, which act as stimuli to cause changes of fixation. Hearing is an important source of such stimuli; so is the vestibular sense. A stimulus to a point on the retina a little to the right and below the macula, for example, causes us to shift our fixation so that the new point will fall on the macula of each eye. This means that the eyes must move to the left and up (and very likely the head is moved a little to favor the change of fixation), also the convergence needs to be altered if the new point is nearer or farther than the old.

When this mechanism is out of order, it is sometimes possible to help it by operations on the extrinsic muscles of the eyes. Hence we have come to speak of the defect (and even to think of it) as a defect of one or more of these muscles, whereas of course it is nearly always in the coordinating nervous mechanism that the defect lies. In order to carry on this kind of binocular seeing, it is necessary then

to have on the one hand the impulse for fusion, the desire for binocular vision, and on the other the ability on the part of the neuromuscular mechanism to coordinate the movements of the eyes in such a way as to maintain the correct fixation, so that the images fall on the two maculae. Without this ability to fixate well, the impulse to fusion becomes a cause of trouble and disability—a positive disadvantage.

A second fundamental requisite for binocular vision—for the exercise of the fusion faculty—is a suitable arrangement and functioning of the visual apparatus above the level of the retina, that is, nerve tracts and higher centers. In the lower animals, the right eye, like the right limbs, etc., is represented in the left brain; the left eye, in the right brain. For this the optic nerves cross and the decussation is total. In the case of animals with binocular vision, the right field is represented in the left brain, just as it is in lower animals, but the right field is half of it the right field of the right eye and half of it the right field of the left eye. Hence for representation in the left brain, half the fibers of each optic nerve go to the opposite side of the brain, so that, for example, the left optic tract is made up of fibers from the left half of each retina. Thus we get the semidecussation of the optic nerve at the chiasm. To each half of the brain in the occipital region, where the visual centers are located, go all the fibers which carry impressions from the opposite half of the visual field. Now we have the problem of how these fibers are represented in the visual cortex.

An object in the right field has an image on the left of each retina, and the two impressions are transmitted to the left visual cortex, but we are conscious of only one impression, not two, under normal conditions. How is this to be explained?

One of the first explanations was that the two sets of fibers united into a single set of fibers, or at least they ended in a single set of cells. Thus the two impulses from corresponding points of the two retinas ended in a common sensory cell and so produced a single sensation. This conception is entirely wrong. There is no doubt that each fiber is separately represented in the cortex, and the fusion takes place by a process of *interpretation of the sensations;* not by a physical fusion of the two sensory impulses, but by a *psychic synthesis* or fusion of the two sensations. Every point in space has two retinal points, one in each eye (producing two sensory impulses), and these are transmitted to the visual cortex. Under certain conditions, they are fused with a single sensation—the perception of the point in space. Under other conditions, they are not fused and either the perception is of two points in space—the one point seen double—or one is suppressed and only one is perceived by consciousness.

I say under certain conditions the two are fused. Let us examine these conditions. The first condition is that the two images on the two retinas must fall on corresponding points. These are points, roughly speaking, which are at equal distances and equal in direction from the macula. The first simple conception of corresponding or identical points is soon found to be entirely inadequate to explain fusion. Just as soon as we analyze the conditions under which we perceive depth or perspective—the third dimension—which is the main reason for the existence of binocular vision, we see that it is precisely because the two images do *not* fall on corresponding points that we are able to interpret the sensation in terms of the third dimension. Hold two pencils side by side about one foot in front of you and about three inches apart. Look at the right hand pencil. Its images are on the maculae of each eye. These are corresponding points and the pencil is seen single. The two images are fused. The left pencil has two images and they are equidistant from the maculae in the two eyes and on corresponding points. They are seen single—the two images of the left pencil are fused. The impression is practically identical with the impression received with one

eye shut—monocular and binocular vision are the same. Now move the left pencil one inch farther away from you. Look at the right pencil. It is seen single as before. The left pencil is also seen single, while still looking at the right pencil, but its images are not on corresponding points. It is just because they are not on corresponding points that we perceive very clearly that the left pencil is farther away, and we perceive very accurately how much farther away it is than the right pencil. Shut one eye and this impression is quite different. We are doubtful whether the left pencil is farther away, and we are unable to estimate the distance with any accuracy. The difference between monocular and binocular vision is marked.

Careful observation may enable you to see that the left pencil is really seen double. I think a better way to put it is, that there are two sensations transmitted to the cortex but the interpretation put on this complex sensation is of a single pencil farther away than the right pencil, and moreover the distance is very accurately estimated. Only by abnormal concentration and analysis can one detect a sort of physiologic diplopia. Verhoeff has detected triplopia, one object seen with one eye, a second with the other, and a third with both.

Hold a pencil, about six inches long, vertical, a foot or more in front of the right eye. With the left eye closed, you can detect easily any slightest tilting of the pencil to the right or left. It is in the plane at right angles to the line of vision and requires no depth perception; one eye can detect tilting as well as two. Now tilt the pencil slightly forward and back towards and away from the eye. With one eye (monocular vision) it is hard to detect such tilting. With both eyes (binocular vision) it is very easy to detect and accurately measure slight tilting forward or back. This requires depth perception—the third dimension of space. The reason one can detect this difference in depth is because the images do not fall on corresponding or identical points of the two eyes.

These two experiments are better understood if we draw two pictures suitable for a stereoscope, which can be fused to show the third dimension as described. For the first, with one pencil farther away than the other, the picture for one eye is like this | |, for the other eye it is like this | |. That is, on one retina they are farther apart laterally than on the other. Similarly the tilted pencil would appear in the picture for one eye / and for the other eye \, and these when fused tilt forward, but not at all to either side.

The law governing the fusion of noncorresponding points may be more easily understood if we look at it from the point of view of stereoscopic pictures or diagrams. What is the limit to the ability to fuse noncorresponding points? Two pictures or diagrams can be fused if the two pictures faithfully copy the two images formed on the two retinas of *any single object or scene.* If an object ever looks like that to each eye simultaneously, then the mind is able to fuse the two pictures, synthesize the two sensations, because they are like a real thing seen by two eyes under certain circumstances.

We have cited two vertical lines, which in the picture for one eye are nearer together than in the picture for the other eye; and yet, in spite of the difference in distance between them, they are fused by the mind into a perception of a pair of lines, not at the same distance from the eyes, but one nearer, the other farther. We have cited the laterally tilted lines fused into a line tilted neither to the right nor to the left but forward or backward. There are many others that might be cited. For instance, suppose a pair of pictures of an area, identical perhaps in size and shape, but one black, the other white. These are certainly very dissimilar, yet they are fused into a surface of very characteristic appearance, viz., a lustrous surface. This is because under certain conditions not rarely met, a single smooth black surface may be so situated with respect to the light and the two eyes that light is reflected from the

surface into one eye but not the other. The result is that one eye sees the surface *light* and the other sees it *dark*. Since we are accustomed to see a smooth shiny surface in that way, we promptly fuse stereoscopic pictures with these characteristics into a single picture showing lustre, i. e., a shiny surface. It is entirely different from combining black and white to form gray.

What happens when a pair of surfaces is presented with the stereoscope, one red, the other blue? As far as I know, no surface in nature looks red to one eye and blue to the other. These are not easily fusible. The result is what is called retinal rivalry. We see now one, now the other. At one moment it looks red, the next blue, or occasionally they may be fused into a single purple area.

In dealing with a pair of images presented one to each eye, we use every effort to adjust the eyes in the way most favorable for satisfactory fusion. Any change in convergence or elevation or even in declination or torsion that can be made to favor fusion will be made. For example, if the images are brought nearer together, the eyes will converge; if one is rotated around the antero-posterior axis, the eyes will execute a torsional movement to help make the fusion satisfactory.

The normal action of the fusion faculty is, first, to bring the images on the two retinas into the most favorable position by such motor adjustments of the eyes as may be necessary; second, to interpret, or synthesize, the two sensations in the light of experience into a single image of greater significance than either taken alone.

The fusion faculty is one of the many not functioning at birth. It takes several years for this faculty to mature and become well fixed. During this period, its existence hangs in the balance. It is easy for the child to suppress or inhibit the vision of one eye, if it is for his interest to do so; and if persisted in, this causes a failure of development followed by an actual retrogression, which it may be impossible to make up later in life. Moreover, it is not simply the fusion faculty which fails to develop under these circumstances, but the persistent suppression soon leads to a retrograde change resulting in a loss of macular vision, which becomes reduced to the grade of extramacular vision—amblyopia ex anopsia. If this condition of persistent suppression is met by proper treatment at a sufficiently early period, the amblyopia may be prevented from becoming permanent. This treatment, as you well know, consists in some device for making the child use the eye it is inclined to suppress. The simplest way is to cover the good eye. Another way is to paralyze the accommodation of the good eye by the use of atropin over a period of months. Atropin works better when, as is usually the case, there is considerable hypermetropia, than when there is little. To secure good cooperation, it is only necessary to make clear to the parents that the object of the treatment is to save the child from blindness of one eye. It is important to make them understand that this treatment is not aimed at straightening the eyes, but at the more immediately important object of saving the sight before it is too late. It is never too late to straighten the eyes, but if the sight is not saved before the age of 6, it is usually too late.

The point I wish to stress is that the fusion faculty is suppressed in these cases of strabismus *because it is for the interest of the patient to suppress it.* He avoids a disagreeable if not an intolerable situation, viz., diplopia, by suppressing one image. The alternative to suppression, if he wishes to escape diplopia, is to secure good fixation and good accommodation, and this may be so difficult as to be a disagreeable if not intolerable alternative. By giving the patient glasses to relieve the work of accommodation, the difficulty is avoided and the strabismus prevented. Notice the fundamental relation which exists between the suppression or inhibition of the sight of one eye and the suppression or inhibition in cases of hysteric paralysis whether of vision or other sensation or of mo-

tion. The patient suppresses *to escape an intolerable* situation. It shows what a fundamental thing inhibition or suppression is. Many other illustrations might be cited.

Another entirely different defect is the diminution of the fusion faculty, not by suppression, but by actual lack or loss. Not all individuals have equally strong desire for, or impulse toward fusion. Various things tend to reduce the impulse for fusion. They are often inextricably bound up with reduced power to execute the necessary coordinating fixation. For example, when very sleepy, it becomes hard to keep binocular fixation, the control of the fixation becomes greatly reduced and probably the impulse to fusion is also reduced. Another example is the diplopia that comes from intoxications of various kinds, such as alcoholic.

When the fusion faculty is insufficient, can it be increased? Undoubtedly, exercise of the fusion tends to improve and increase its function. On the other hand, when it is absent, no amount of training is likely to bring it into being. There is a difference of opinion about the value of fusion training, some claiming a large measure of success and some denying it. It is my belief that this difference of opinion may be explained in this way. Where there is a fusion faculty but it is in abeyance, or perhaps imperfect, certainly not active, it is possible by suitable exercises, properly and patiently carried out, to develop this imperfect faculty to a marked degree. A patient who has only simultaneous vision with the two eyes may be made to get binocular perception and, for example, learn to read with a bar reading device. He may even acquire the highest degree of binocular vision and get stereoscopic depth perception. On the other hand, a patient who actually lacks the fusion faculty, in whom it is not simply in abeyance, but actually absent, cannot by practice acquire this absent faculty. Now the practical clinical point I wish to emphasize is, that you cannot be sure whether the faculty is absent, or is only suppressed or undeveloped. Hence the patient should be given the benefit of a trial. If he is willing to undergo training, and one has time, skill and patience, the result may be very satisfactory. I know that some oculists are very positive that in certain types of squint (e. g., alternating), and in any type after a certain age (6 to 8 years), fusion training is futile. A few positive results are sufficient to knock the ground from under these too sweeping generalizations. Where one has to defend his thesis by saying that all cases which prove the contrary are errors of diagnosis, it shows that the subject requires further elucidation, and that since errors of diagnosis are quite likely to occur, the safe ground, for those like you and me who disclaim infallibility, the safe ground for us to take is not to be cock-sure that the case cannot be benefitted, but to give it the benefit of an earnest attempt at training.

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CONTRIBUTING FACTORS IN FAILURE TO CORRECT CONVERGENT CONCOMITANT SQUINT.

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Failure to correct the squint may be failure to secure binocular vision or cosmetic failure. The former depends on refractive error left uncorrected, amblyopia ex anopsia or defective fusion faculty. The latter is due to either poor choice of operation or defective surgical technic. The writer's methods of avoiding these causes of failure are described. Read before the Chicago Ophthalmological Society October 19th, 1925. (See p. 293)

Good results in the correction of convergent concomitant squint are either essentially successful or cosmetically so. In the former group, the fusion faculty is restored to normal activity, and single binocular vision is restored with or without operative interference. In the latter group, single binocular vision is not obtained, but a satisfactory operation restores the visual axes to approximate parallelism. Strictly speaking, this group should include only those cases in which the fusion faculty is totally absent, or amblyopia is of such a degree that training will not correct it. Cosmetic failures, judged after this fashion, may, therefore, be attributed to imperfect surgical procedures, in all but a few instances. Unfortunately, because of improper management of many cases before operative measures are instituted, the group of cosmetic successes is much enlarged by cases which should be regarded as essential failures.

In the truest sense of the words, "perfect results" in the correction of concomitant squint means restoration of single binocular vision. In a limited number of cases, this can be accomplished without the aid of surgery; but in a larger number, surgery becomes an important part of the treatment.

Excluding the cosmetic group, three factors are operative in failures to correct this form of squint: First, the refractive error; second, the presence of amblyopia ex anopsia; and third, a defective fusion faculty. The fourth cause for failure is purely surgical.

In the experience of the writer, uncorrected visual defects are fundamentally the chief cause of failure. When the refractive error is high, and especially when it is unequal in the two eyes, amblyopia ex anopsia is apt to follow promptly. Furthermore, uncorrectable amblyopia furnishes an insurmountable barrier to the obtaining of single binocular vision. Whether the amblyopia is congenital or acquired is deserving at least of passing notice. It seems to be the consensus of opinion that few cases are congenital. The fact that amblyopia is present early in life, in the absence of ophthalmoscopic reasons for the same, is not convincing evidence of its congenital character. On the contrary, the early appearance of unilateral squint forecasts an early and profound amblyopia ex anopsia. This is especially apt to be the case if anisometropia is present. This being a fact, the first logical step in the management of squint is an early estimation of the refractive error by means of retinoscopy. Failure to make this study as soon as the squint becomes definitely manifest, even tho the child is but one or two years of age, brings about the first barrier to a successful management of the case.

The means of prevention of this barrier are: First, the education of the general practitioner to a more general appreciation of the fact that squint patients should be referred at once to the specialist for study; and second, a better appreciation on the part of the specialist that high degrees of hypermetropia and anisometropia should be corrected even at the early age of sixteen months. Until this fact is fully appreciated by the family physician and the specialist, the number of failures to effect real cures in squint will remain large.

In logical sequence, the second great cause for failure lies in amblyopia ex anopsia. It is not sufficient to correct high refractive errors, but

measures to prevent or to correct, if present, any tendency to amblyopia are equally important. The occlusion of the fixing eye for periods varying from two to six hours daily, while the child is awake, is the best method of procedure. If the intelligent cooperation of parents can be obtained, this practice is effective and not attended by any of the dangers incident to the use of atropin. In children from five to nine years of age, amblyopia, well established, can be overcome by this method. At this age, in my experience, at least four hours of occlusion are necessary daily. It also is an interesting observation, that two hours of occlusion while doing school work, especially copying, is of more value than a six hour period of occlusion while at play. Improvement may be expected in older children, but the best results are obtained in the earlier years of childhood.

Causes for failure are intimately linked and interwoven. Failure to correct refractive errors, especially if high and unequal, marks the beginning of amblyopia. Amblyopia ex anopsia, in most instances, marks the beginning of the third cause for failure, namely, inability to train a defective fusion faculty. The average potential squinter starts life with a fusion faculty equal, in most instances, to that of the normal child; but the development of amblyopia interferes with the proper education of this faculty. The third factor in failure to cure thus has its inception.

Until the child is three or four years of age, the surgeon must rest content with the correction of the refractive error and orthoptic training to preserve equal or nearly equal visual acuity in the two eyes. It is not possible to obtain satisfactory information as to the state of the fusion faculty before this age. It is the third important factor, however, in the management of squint, which should be studied at the earliest possible period in the child's life. Failure to give proper consideration to this faculty furnishes the third impassé to complete cure of convergent squint.

No better method of study has been devised than that of Claude Worth. What is the state of the fusion faculty? Is it totally absent, or if present, what is its degree of development? The average child at four years of age can give satisfactory answers in the use of the amblyoscope. If only simultaneous macular perception can be obtained and fusion is absent, the case is at once classified as belonging to the second group, in which only cosmetic results can be obtained. If, however, even a moderate degree of fusion is present, training with the amblyoscope may increase the fusion power, and lead to perfect results, occasionally without operation, more frequently with a correctly performed operation, followed by postoperative fusion exercises. It is not germane to the subject to discuss the details of fusion training. Our paper deals with causes of failure. We but wish to point out some of the weak spots in our management of squint. There may be differences of opinion as to the nature of the fusion faculty, or fusion center, as to whether it is positive—a desire for single vision, or negative, as Van der Hoeve is fond of calling it—"diplopiafobia". But there can be no difference of opinion as to one's ability to train and develop it, if present, by proper methods. Its presence and its training are essential in obtaining a cure from convergent squint. The natural corollary is, neglect to give it proper consideration before and after operation is one of the chief causes of failure in the perfect correction of squint.

OPERATIVE FAILURES.

If the three factors thus far discussed, namely, refractive errors, amblyopia ex anopsia, and the fusion faculty, have received proper consideration in any given case, and an operation becomes necessary, the results, nevertheless, may be imperfect because of the choice of operation and the execution of the surgical technic. What are some of the factors in the surgical technic which result in failure? They may be classified first under "choice of operation", and second

under "surgical technic". The first is a matter of faulty surgical judgment; the second, one of faulty judgment and faulty technic combined.

Choice of Operation. The choice of operations, suitable for the first group of cases, is limited to resections without or with advancements, recessions, and tucking operations. Tenotomies have no place in this group. In fact, it is doubtful whether a complete tenotomy is ever justifiable. Complete tenotomies are destructive from a functional standpoint, as well as dangerous. If tenotomy seems to be indicated in very high degrees of squint, when bilateral advancements are not sufficient to overcome the defect, either a recession of the tenotomized muscle should be practiced, or the muscle should be held under control by a suture attached to the stump. The former method is preferable. Partial tenotomies are almost useless. It requires good surgical judgment to decide whether a resection alone will suffice and the extent of such resection, or whether an advancement is also indicated. Fortunately, if resection and advancement are practiced, imperfect results may be corrected by similar operations on the fellow eye.

Recessions are deserving of consideration. In a certain number of cases, it is advisable to limit the surgery to one eye. Under such conditions, instead of tenotomizing a muscle, the cut tendon should be anchored to the sclera by the method advocated by Jameson (Arch. of Oph., 1922, p. 421), or by some other satisfactory method. By combining a recession with an advancement of the opposing muscle, one can easily overcome very high degrees of squint. This indication for a recession operation in squint, in my experience, is the important one.

Although it would seem that Jameson gives preference to a recession of the internus over advancement of the externus in low degrees of esotropia, it is doubtful whether this preference is justifiable. Three facts should be considered. In the first place, an advancement is more easily performed, because the episcleral tissue is thicker in front of the tendon than it is posterior to it and perforation is less likely. Second, an advancement increases the power of external rotation by increasing the arc of contact, and the diverging power is increased. This is desirable because, at best, divergence is low. Third, unless one is forced to interfere with convergence, which is so necessary thruout the greater part of the day, it is best to increase divergence. Altho a recession of the internus four or five mm. back of the stump may admit of fairly good converging power, sustained convergence for the near point can rarely be obtained. When one looks forward to restored single binocular vision, the question of sustained convergence should be our first consideration. The evidence, therefore, in my judgment, is in favor of an advancement when the choice rests between a recession and an advancement.

Tuckings, altho favored by some, are disappointing. If properly performed, a tuck may furnish satisfactory results in the milder degrees of squint. Complications and improper technic, however, furnish a larger percentage of failures than is desirable in squint correction.

Faulty Technic. Failures which are the result of faulty technic in advancements as well as in resections, are largely due to faulty judgment as to how much to resect, or to the slipping of the sutures. When the muscle is advanced, a good bite must be taken in the episcleral tissue in order to secure good anchorage. A second cause for the cutting thru of the anchor stitches, is failure to keep both eyes closed for a sufficient length of time. In any type of advancement and resection, it is desirable to bandage both eyes for a minimum period of five days. In my experience, any recession of the muscle due to slipping of the sutures occurs after the bandage is removed from the unoperated eye.

A thru and thru puncture of the sclera is of rare occurrence, and may be avoided by the wearing of operating glasses, which will give the operator a closeup view of the operative field when the needle is introduced into the episcleral tissue.

Failures due to tucking may be because of the technic of the operation, or for mechanical reasons. If the sutures are properly introduced, so as to preserve the integrity of the vascular nutrition of the muscle and tendon, failures can not be attributed to the technic *per se*. The operation, however, has mechanical limitations. In the case of the external rectus, for example, no increase in the mechanical purchase of the muscle can be obtained. The external rectus is attached well back of the limbus, and the contact arc is therefore not increased by shortening the body of the muscle, as it is in a properly performed advancement operation.

There are differences of opinion as to the increase of the contact arc after an advancement. In the studies made by Worth, his conclusions were that the arc is increased in a correctly performed advancement. Clinical experience confirms this observation. The tuck, therefore, in my judgment, can accomplish only the same degree of correction that may be obtained by a resection.

The chief complications in tuckings arise from the suture material. Chromacized catgut is not satisfactory. Tumefaction occurs in a certain number of cases. In some instances, the catgut fails to undergo absorption in the proper time, and occasionally one is obliged to remove parts which fail to become absorbed. In practically every instance, the tumefactions subside in time and leave little, if any, thickening. Their presence, however, causes much annoyance to the surgeon and to the family. Buried silk sutures, on the other hand, are not desirable and should be avoided.

The method of Burch (Arch. of Oph., Vol. LIV, p. 333), with modifications in the method of introduction of the silk sutures, is a distinct advance over other methods now used. It is my belief, however, that the sutures should be introduced so as to allow the central part of the muscle to remain intact. This method preserves the nutrition of the muscle, and saves the unfortunate results reported from time to time, with total failure of the operation.

Finally, if perfect results are sought in the first group of cases, following operation, fusion training again plays an important role. Neglect to use it may add many cases to the second group of cosmetic results which logically would belong to the first.

It is not possible in every instance to conduct a case thru the logical steps indicated in this paper. We do not always have the cooperation of the parents. It is possible, however, to reduce the number of failures in the first, or essentially successful, group. Cosmetic results are counted as 100 per cent good results by the layman. From our standpoint, such results are not satisfactory. Single binocular vision should be our goal. It can be reached in a large number of cases, if each patient is subjected to the routine studies as outlined in the first part of this paper.

Surgical success improves with practice and experience. The adoption of a single operation in any group which is fundamentally sound, and the practice of the same on cadaver and on patient, is the best means of acquiring the surgical skill necessary to yield good results. One could extend indefinitely the discussion of the various phases of failure in surgery, but it is my belief that greater stress should be placed on the fundamental causes for failure. Surgery is fascinating, and one needs no incentive to perfect his technic. The desire and necessity for accuracy are always present in ophthalmic surgery. It is, however, in the plodding, painstaking preparation of the patient before surgery can be considered, in which we need more enthusiasm. This study and preparation forms the basis of our successes and failures.

CONGENITAL ECTOPIA LENTIS.

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This is a report of two cases including notes of the findings with the slit lamp with extracts from the literature bearing on the origin of such anomalies.

The rarity of this condition makes it of interest at all times. The study of congenital conditions is always of the greatest importance, since it is in this manner that we arrive at a correct appreciation of the embryology of the human eye and likewise determine the reasons for certain developments in the course of treatment.

The case under consideration occurred in the person of a young man and had been known to exist from birth. We have no definite record of any similar condition in any of his near relatives but some vague and indifferent references to ocular disturbances in collateral heirs. The familiar features of the cases may therefore be readily dismissed. Both lenses were luxated and opaque. One was displaced outward and slightly down, the other decidedly down and slightly in, the cases showing absolutely no tendency to symmetry. Tremulous irides was readily demonstrated in both eyes and vision was very greatly reduced. With oblique illumination, using the ordinary pocket condensing lens, striated lines were seen bridging the gaps between the luxated lenses and their original attachments, as shown in the illustration used by H. V. Würdemann in the American Encyclopedia of Ophthalmology, 1914, Vol. X, p. 7204.

Our especial interest lies in the findings obtained by the higher illumination afforded by the slit lamp and viewed by the corneal microscope. This case is therefore published in order that the value of the slit lamp as a diagnostic resource might be contrasted with the facilities available for such purposes at a prior date.

In the illustrations of the cases here recorded the expert knowledge and skill of Mr. Basil Graves, who has done so much for the advancement of the Slit Lamp Technic, is utilized to supplement the findings of myself and assistants, who, while not entirely unaccustomed to the application of the apparatus, lack the familiarity with it that Mr. Graves possesses.

Fig. 1. Ectopia lentis. Author's case showing different positions of the lens in two eyes with the elongated fibers of the suspensory still attached.

One point of peculiarity is the position of the lens in each eye, and a second point of equal prominence is the asymmetry of these positions. Both irides are tremulous causing the pupils to appear to oscillate.

In the right eye the lens is separated from its accustomed attachment nasally leaving a large semilunar gap on the entire nasal margin. This area on close examination shows definite fibers running straight and apparently taut from the normal zonule to and into the lens margin. Scattered thruout these fibers are numerous granules. Fine granules are also demonstrable in the aqueous. With ordinary oblique illumination they would not be visible. There is a fairly

regular curve to the exposed edge of the lens which is somewhat fluted, and it has a bright peripheral ring. The fibers bridging the intervening space that the lens should occupy are not very closely packed, having distinct intervals between them, and they are very coarse. They are radially disposed and descend well into the anterior face of the equatorial periphery of the lens. With the ordinary oblique illumination these could be seen reaching from the remote base of the suspensory ligament, but this ultimate termination in the lens could not be determined. They appeared to reach merely to the lens but not into it.

The aqueous was visible by means of the granulous particles within it. The vitreous was seen to be packed with red brown granules enmeshed (and a few large white spots) in the swaying structure. Compare this with the aqueous and vitreous of the left eye. The left eye shows a large semilunar gap between the lens and its normal attachment above, not at all symmetric with the right eye. Here coarse radial fibers are observed but their arrangement is not so definite and uniform. There are many gaps in the distribution of the fibers which are bridged by mere threads in many instances suggesting the possibility that the fibers are broken in these situations. This is especially true above. There are many perfect fibers, however, especially to the temporal side. In the upper center of the semilunar gap a pigment spot is to be seen. These fibers terminate in the lens in the same manner as in the right eye. There is a bright peripheral ring to the lens no matter where the beam of light is thrown. The exposed edge of the lens is somewhat fluted and is not quite circular being inclined towards its more perfect fibers on the temporal side.

The aqueous beam shows normal visibility.

The vitreous is not unduly relucent showing there are no granulations in it.

This deep fibrous attachment of the lens to its zonule emphasizes the fact that in many of these, if not all "congenital luxations," the lens is really not luxated as the connection is still intact albeit considerably attenuated. Perhaps as has been suggested the lens has not grown sufficiently to occupy the space provided for it. This feature of the suspensory ligament will explain the failure so frequently experienced of the ordinary cystitome to release the lens in the cataract operation.

It affords me no little satisfaction to find these fibers so deeply situated, as for many years I have employed a special form of cystitome that reaches far down behind the iris and near the margin of the lens where it now appears the fibers are the weakest.

The slit lamp affords us so many opportunities to confirm clinical experience of this character. But while a valuable supplement to our technic, enthusiasm for it should not lead us to discard other older and equally diagnostic means.

It is of interest in passing to refer to some of the other recorded observations upon the subject of ectopia lentis. Thus Burk (quoted in the American Encyclopedia of Ophthalmology) states that it is essential for the production of the luxation whether spontaneous or acquired that a complete separation of the zonular fibers should have taken place. He found in traumatic cases numerous instances of the fibers both on the anterior and posterior surfaces. These were too short to correspond to whole fibers, part of which must therefore have remained attached to the ciliary processes. Therefore, he states the luxation may occur with two different conditions of the zonular fibers, one in which partial or complete rupture has taken place and the other in which no rupture has occurred. The illustration by Würdemann, previously referred to, shows diagrammatically the retention of the fibers in one case and the occasional fragmentation in the other.

In the article upon "Ectopia Lentis" by William Frederick Hardy in the American Encyclopedia of Ophthalmology, Vol. IV, p. 2871, there is

much of interest. He notes its rarity and its disposition to symmetric arrangement and bilateral character. It usually occurs upwards, inclined slightly outwards or inwards, usually the former. Other positions are down and in, outwards, down and out, the frequency in the order named. It is rarely symmetric. It is said, however, that displacement never occurs downwards altho this was noted by Adams. Hardy's article further informs us that in the clinical examination the edge of the lens may or may not occupy the pupillary region, dilatation being necessary to see the edge, our attention being drawn to the eye primarily because of the iridodonesis. Where the pupil is large enough to reveal the lens edge it is divided consequently into a phakic and aphakic part, in which cases monocular diplopia must of necessity supervene. The anterior chamber is deepest on the aphakic side, the side from which the lens is displaced. As already noted the iris is found to be tremulous (iridodonesis). The edge of the lens by reflected light appears as a dark crescent, the lens itself being gray and the aphakic part at its margin black. The dark crescent is due to the strong prismatic refraction. The curved edge of the lens as seen with the ophthalmoscope is not always regular but may show slight depressions or elevations. The depressions in the border may amount to a notch constituting a coloboma (R. Marcus Gunn). Occasionally the margin instead of being curved is nearly a straight line. This very exhaustive article further states that the suspensory ligament as a rule is completely absent in the region corresponding to the aphakic area, the lens being dislocated away from the point of the absent zonule. Absence of the suspensory ligament produces a movable lens.

From our own observations in this case we are inclined to favor the view that a certain proportion of cases are due to arrested growth of the lens and its failure to fill the space alloted to it completely. In the early development of the lens, we are told, it virtually fills the secondary vesicle which later by its rapid growth draws away from the lens. During the stage of contact of the lens equator with the ciliary region adhesions are formed which when these structures separate are drawn out into fibers which ultimately become the fibers of the suspensory ligament. This is Treacher Collins' conception of the suspensory ligament formation. Now anything that would interfere with this preliminary contact would produce this defect. Such interference could be brought about by a partial persistence of that portion of the intruding mesoblast which passes forward in all directions around the lens equator to join with the mesoblast growing in anteriorly to form the capsulo-pupillary membrane. Wherever a strand of this tissue persisted development of the suspensory ligament would fail. This is probably what takes place in the atypical cases of ectopia lentis.

Fig. 2. Symmetric dislocation of the crystalline lens in a common direction, out and slightly upward.

One of the most exhaustive of mod-

ern papers on the subject of the changes in the crystalline lens as seen with the Gullstrand Slit Lamp and Corneal Microscope is that of Arthur Bedell of Albany, N. Y., which was read before the Ophthalmic Section of the A. M. A. June 1923, and published in the transactions of the same for that year. He shows an illustration of a binocular case of congenital luxation of the lens, but gives no notes as to the direction or the symmetry of the same. He notes the uneven margin of the lens and the presence of the zonular fibers extending to the anterior and posterior capsule. Apart from this he gives no further comment on the condition except to state that no one else in the family had it.

We cannot dismiss the consideration of the condition entirely without reiterating the statement already made, that this case emphasizes the depth to which the fibers of the suspensory ligament extend and the practical bearing this has upon the use of the cystitome.

303 So. 17th.

INTRAORBITAL ANESTHESIA.

MARTIN D. ICOVE, M. D.

SAN FRANCISCO, CALIFORNIA.

The anatomy and physiology bearing on this procedure are discussed. The technic of making the injection is described and the reason for instilling cocain. The special application of this form of anesthesia in cataract, glaucoma, enucleation of eyeball, application of thermophore, painful subconjunctival injections and strabismus operations are then described. Read before the Pacific Coast Oto-Ophthalmic Society, June, 1925.

Intraorbital anesthesia in ophthalmic surgery is of such vast importance that its application and technic should be better understood. The reasons it is not more generally employed may be two-fold. First, the fear of injuring the intraorbital contents, and second, a lack of familiarity with its advantages. The first may be easily cleared up when we briefly consider the anatomy.

The orbits are cone shaped cavities with their apices directed inward and upward. There are no structures of importance on the floor of the orbit temporally. Practically all the vessels and nerves enter the orbit at or near the apex and pursue a course along the nasal and superior side of the bulbus. The inferior temporal portion of the orbit containing no important structures makes it the ideal place for the insertion of the needle.

The nerves we wish to block are the long and short ciliary nerves, and are best reached just anterior to the ciliary ganglion. The long or sensory root of the ciliary ganglion is made up of branches of the nasociliary nerve. The ganglion is a small reddish brown structure, pinhead in size, situated between the external rectus and optic nerve, and about 15 millimeters behind the eyeball. It is from this ganglion that the short ciliary nerves rise. The long ciliary nerves, usually two or three in number, are also branches of the nasociliary nerve, but are given off just above where the nasociliary nerve crosses the optic nerve. They run forward to join the short ciliary nerves. To reach these structures the injection must be given temporally, because the ganglion is on this side and thus can be more easily and safely reached. To block the nasociliary nerve directly, it would be necessary to give the injection in the upper and nasal part of the orbit, but this endangers the optic nerve. By properly blocking the sensory nerves in the area of the ciliary ganglion, sensation to the cornea, sclera and iris is abolished.

The type of anesthesia discussed in this paper is conductive, and is obtained by the perineural injection of novocain about the area of the ciliary ganglion. If it were practical to give an endoneural injection, such as Crile gives in general surgery, that is, injecting directly into the ganglion, we would obtain our anesthesia immediately, but as this is not feasible we

must allow ample time for absorption to take place. To quote Hirschel "Conductive anesthesia represents the completest state of anesthesia. In a perineural injection it is always necessary to give larger quantities of solution of a higher concentration, and the time elapsing before operation must be longer."

TECHNIC.

The solution used for all our intraorbital anesthesia is a 4% solution of novocain. Metz puts up a preparation in ampules, known as 4% solution T, which contains a slight amount of adrenalin. We have found this to be very satisfactory. Formerly we used a one or two per cent solution, but discovered that to get a sufficient anesthesia a greater amount had to be given than with the 4% solution. This quantity sometimes caused a slight proptosis, which was objectionable in certain cases. We find that the amount injected must vary with the operation to be performed.

The technic used, is that described by the Greens in 1922. Briefly it is as follows: A 2 c.c. Luer syringe is used with a needle about 5 cm. long and a number 22 gage. The site of injection is thru the skin at the junction of the lower and outer border of the orbit between the external and inferior recti. The site of puncture is thoroly painted with tincture of iodin, allowing the solution to remain on the skin long enough to permit of ample sterilization. The point of the needle must be directed slightly upward and inward to avoid striking the floor of the orbit. If the floor is encountered, the lowering of the wrist usually corrects the needle's course. In young adults particularly, we often get into denser tissue, which, altho resistant, can be pierced. The orbital fat and connective tissue is much firmer and more abundant in younger subjects than in older ones. After the needle is pushed all the way in, the entire amount of novocain is injected posteriorly, and the syringe emptied before withdrawing the needle. Otherwise, a subconjunctival injection may result, which interferes with some operations. The insertion of the needle is sometimes rather painful, but if done quickly it is soon forgotten. While injecting the solution into the orbit the patient may complain of local numbness, which is transient.

The best time to operate is about a half hour after the injection has been given. This gives one sufficient time to complete any ocular operation, as the anesthesia will usually last for an hour to an hour and a half. The main danger lies in starting to operate too soon. The greater the inflammation, the larger the quantity to be injected and the longer one must wait before attempting to operate. In an acute glaucoma three quarters to one hour is not too long to wait.

We have given over one thousand intraorbital injections to date, and have injected novocain in amounts varying from one half c.c. to four c.c. of a 4% solution and have seen no toxic effects. In a few instances we have had patients who, after operation, become nauseated. We do not believe this was due to the novocain, as nausea may occur in cases that do not receive the deep injection. The etiology is perhaps of a nervous origin.

The only complication we have had in our series was one of intraorbital hemorrhage. Immediately following the intraorbital injection for a cataract operation, the patient remarked that his eye felt as if it were swelling. We observed a rather marked proptosis which was rapidly increasing and in a few seconds was causing extreme pressure on the cornea and bulbus. Immediately, an external canthotomy was performed. The operation was postponed, cold compresses applied at intervals and the eye firmly bandaged for the remainder of the day. The diagnosis of intraorbital hemorrhage was made clear by the appearance of a marked subconjunctival hemorrhage that same evening. The proptosis gradually decreased, and in five days the cataract was extracted. This, however, was done without intraorbital anesthesia. The patient went thru the operation uneventfully with no undesirable after effects.

The intraorbital injection is supposed to decrease the intraocular tension and for that reason has been recommended by Fromaget in glaucoma. In our investigations we have found the contrary to be true, and that in practically all cases the intraocular tension was raised from 5 to 10 mm. The tension was taken with the McLean tonometer before injection, and immediately before operation. This increase of tension we do not believe to be an actual intraocular hypertension, but a pseudotension, due to the increased volume of the orbital contents. However, in our observations the tension was taken from one half to one and one half hours after injection, altho there may be a reduction of the tension after that length of time. There is usually a slight proptosis following all injections. This varies with the amount used and becomes less the longer one waits after injection.

CATARACT. We have found the intraorbital injection of greatest aid in the operation for the extraction of cataract. The intraorbital injection is given about three quarters of an hour before the time of operation. This allows plenty of time to thoroly block the ciliary nerves and permit of sufficient absorption to reduce the amount of proptosis. The quantity injected is one half c.c. of a 4% solution. Formerly we gave one and one half c.c. of a 2% solution but on further experience we reduced the amounts and thereby minimized the proptosis. The lids are anesthetized by a modified Van Lint procedure.

Altho all our bulbar operations are preceeded by an intraorbital injection, it is also necessary to instil several drops of cocain into the cul de sac for the following reason: The intraorbital anesthesia blocks the ciliary ganglion and long ciliary nerves, which supply the bulbus but not the conjunctiva. The conjunctiva gets its nerve supply from the supraorbital, supratrochlear, lacrimal and infraorbital nerves. All of the above nerves are located higher and more nasally than the ciliary ganglion, and get very little of the novocain that is injected. If, however, an additional intraorbital injection were given nasally and above, most of the conjunctival nerves would be blocked. But as long as the instillation of a few drops of cocain in the conjunctival sac so adequately anesthetizes the conjunctiva there is no object in using a nerve block, particularly when one is likely to injure the optic nerve by this upper nasal route.

Therefore, to obtain perfect bulbar and conjunctival anesthesia one should use the lower temporal intraorbital injection supplemented with the cocain instillation. The iris is not sufficiently anesthetized by the instillation of cocain into the conjunctiva sac, but is thoroly anesthetized by blocking the ganglion. The moment a patient is hurt he becomes unruly. If he feels severe pain while the iridectomy is being done he will fear each succeeding step in the operation. At the time it is most desirable for him to be quiet, that is, during the lens delivery, he is apt to be the most unruly. If he feels no pain during the iridectomy, the extraction can be performed with much greater safety. The same holds true when a preliminary iridectomy is performed. The patient remembers the former pain and is apt to be more nervous on that account at the time of extraction. In performing a cataract operation, whether it be a capsulotomy or intracapsular extraction, the patient should, in the writer's opinion, always be given an intraorbital injection.

GLAUCOMA. By giving an intraorbital injection of novocain the operations for chronic glaucoma proceed as smoothly as do the cataract operations. Here, the amount of novocain given should be about the same as for cataract extraction. About one half hour after the injection the eye will be ready for the iridectomy, cyclodialysis or trephining, as the surgeon may choose.

For acute glaucomas the intraorbital injection has a medical as well as a surgical use. In the acute case, the patient must have relief quickly. The injection of several cubic centimeters of 4% solution of novocain will

give relief in 5 to 10 minutes, that lasts for several hours. You now have the chance to use miotics, compresses, leeches, etc., and to reduce the tension before the anesthesia wears off. Thus it is often possible to reduce the tension painlessly while considering the future course, if for any reason immediate operation is inadvisable. In acute glaucomas, a larger amount of solution is always necessary, therefore, 3 c.c. of a 4% solution should be given and a longer interval allowed for the production of anesthesia, because of the slow absorption. At least an hour must elapse before operation. On account of the marked injection, cocain instilled into the cul de sac is not sufficient to anesthetize the conjunctiva and usually a supplementary subconjunctival injection of novocain is required. This is necessary to obtain conjunctival and not bulbar anesthesia. We have frequently observed that immediately after the conjunctiva had been cut the patient no longer complained of pain, indicating that the conjunctiva had not been sufficiently anesthetized.

ENUCLEATION. Since using this procedure we practically never give a general anesthetic for enucleation, except in children. Here at least three to four c.c. of the 4% solution should be given about three quarters of an hour before operating. Practically all eyes that must be enucleated are acutely or subacutely inflamed and need plenty of solution. The site of injection and the method is the same as above, except that a larger amount is used and a longer time allowed for the effect to take place. Here one practically always needs a subconjunctival injection to properly anesthetize the conjunctiva. If no subconjunctival injection is given, the patient will experience some pain while going through the conjunctiva.

SHAHAN'S THERMOPHORE. We have found this to be an excellent instrument for arresting and treating corneal ulcers. But with the usual method of using the thermophore, by the instillation of cocain, the pain is so great that it cannot be applied sufficiently long to obtain the maximum results. By the injection of one and one half c.c. of novocain into the orbit the instrument can be applied to the cornea with absolutely no pain for the length of time that is necessary to obtain the best therapeutic action from the thermophore.

SUBCONJUNCTIVAL INJECTIONS. The subconjunctival injection of cyanid of Hg. is extremely painful but forms a very valuable method of treating certain eye conditions; such as incipient cataract, uveitis, corneal ulcers, toxic amblyopia, etc. One and a half c.c. of 4% solution of novocain injected into the orbit will permit the subconjunctival injection of mercury to be given with perfect comfort to the patient.

STRABISMUS. In the operation for strabismus we find that the injection does not entirely do away with the pain caused by the traction on the muscles; and furthermore, it has the disadvantage of frequently paralyzing the inferior and external recti, thus misleading one as to the amount of correction to be made. The intraorbital injection simply lessens the pain caused when passing sutures through the episcleral tissue.

Other operations upon the bulbus such as sclerotomies, eviscerations and removal of foreign bodies, etc., can be more advantageously performed by using the above recommended anesthesia.

I wish to acknowledge my indebtedness to the department of Ophthalmology of Mt. Zion Hospital and Clinic for the facilities furnished me, and to the Doctors Green for their material aid and suggestions, which made these observations possible.

LID TRACTION THE GREATEST SAFEGUARD AGAINST VITREOUS LOSS IN CATARACT OPERATIONS.

P. OBARRIO, M. D.

SAN FRANCISCO.

A means of temporarily reducing intraocular pressure during cataract extraction is needed to guard against loss of vitreous. The mechanics of lid traction and the anatomy concerned are discussed. The application of the mechanical principles involved is explained, and the indications for lid traction are given.

Clinical observation shows: (a) that an eye with a diminished tension is less prone to vitreous loss when the lens is removed; (b) that eyes showing a collapsed cornea after the evacuation of the anterior chamber, will stand a very considerable manipulation without vitreous loss; (c) that pressure on the eye globe will materially increase the danger of vitreous loss in direct ratio to the force employed; (d) that eyes with increased tension are particularly prone to vitreous loss after the cornea is incised.

It would seem then that if we could devise some harmless means of producing an artificial and transitory reduction of the intraocular pressure during the course of cataract extractions, we would have an invaluable aid at our command to safeguard against vitreous loss and its attending ill results. It has been my experience during the course of cataract extractions and following the incision, that if considerable traction is exerted on both lids, avoiding all pressure on the eyeball, in most cases the cornea collapses. With the eye in this condition I have been able to undertake risky manipulations, including the insertion of wire loops or spoons behind the lens without fear of vitreous loss. It is rather puzzling to understand how and why traction on the lids affects the eye which is so freely movable in the orbit. My interpretation of this extremely interesting problem, I believe, answers the question.

MECHANICS OF LID TRACTION

The eyeball is held in its four quarters by a muscular cone and further supported in the orbit by a considerable cushion of fat. A very great freedom of motion is obtained as is evidenced by the voluntary and concerted movements of the eye during the act of vision, these movements taking place around the center of rotation.

Besides this, if the eyeball is grasped with the fingers over the closed lids, one can displace it quite considerably in any lateral direction with respect to its antero-posterior axis. Likewise, if pressure is applied directly backwards, the eyeball will recede slightly, and we know that it can be displaced anterior ly also to some extent, as shown during surgical operations about the eye muscles, as well as by forcible displacements due to retrobulbar neoplasms.

However, please remember that the forward displacement of the eye can at best be very limited in extent under normal conditions, as it is quite firmly held by the four recti muscles with their fixed origins at the apex of the bony orbit and firm insertions at the sclera. This arrangement is most favorable towards securing the maximum effect of lid traction, as the eye is steadied in the orbit whilst its anterior segment reacts to said traction as I shall explain later. Yet with all this freedom of motion regarding outside forces, the eyes always maintain the same position in the orbits without advancing, receding or moving laterally, except rotating about the center of their spheres in response to conscious efforts. This position is maintained with mathematic precision, for otherwise rays of light could not form correlated and exact images in the retinas.

ANATOMIC CONSIDERATIONS.

Although the foregoing is rudimentary, yet it is essential to the proper understanding of the mechanics of lid traction; so let us remember: That the lids, altho freely movable apply closely to the eyeball. That the conjunctiva is intimately connected to the free border of the lids. That the conjunctiva is quite firmly attached to the

cartilages of the upper and lower lids. That at the upper and lower cul-de-sac it is freely movable over underlying structures. That over Tenon's capsule and the eyeball proper, it is also freely movable.

That in spite of this gliding motion, one must always remember that because of connective tissue trabeculae, and because of the nonexistence of a free air space between conjunctiva and underlying structures, as well as because of the ever present cohesion which is one of the most powerful natural forces that we know of, any mechanical action applied to the conjunctiva as a whole thru both lids, will react immediately upon the anterior segment of the eye.

For purposes of demonstration and also because embryologically and anatomically correct, please consider the lids, conjunctiva and cornea as one continuous surface with intimate attachments at the free border of the lids and at the corneal margin.

MECHANICS.

If a piece of rubber sheeting is stretched and closely tied over the mouth of a closed vessel like a jar, for example, any pressure applied over this flexible cover will produce an increased tension or a plus pressure inside the jar. Likewise, traction exerted on this flexible cover will produce a minus pressure in the jar chamber. These changes of pressure may be easily demonstrated by manometric readings.

Following further on this line of thought, imagine, for example, a large glass syringe in which the inlet orifice of the cylinder had been sealed. Suppose that the piston had been set at about one-third down the cylinder when the inlet orifice was sealed. This will of course produce a closed air chamber in the cylinder. As air and gases are compressible and extremely elastic, you will be able to force the piston in or out to a certain extent.

A forward thrust of the piston will produce a plus pressure in the cylinder chamber. A pull on the piston will produce a minus pressure in the cylinder chamber. Imagine instead that we have filled the cylinder chamber with a liquid or fluid such as oil for example. Efforts to force the piston in or out of the cylinder will be of no avail, for liquids are incompressible. But the important question to remember is that you know as shown above, that a plus or minus pressure is being exerted within the cylinder chamber as it can be demonstrated and measured with a manometer connected with said chamber.

Imagine now further, that the piston instead of being solid is hollowed like an automobile piston, and also that it is opened at both ends. Suppose that the distal end, that is to say the end inside the cylinder, is covered with a piece of rubber sheeting making a perfect fit with the cylinder wall. We have now again a closed air chamber as before. When the piston is forced downwards, the rubber membrane stretched over its end will bulge outwards towards the inside of the hollow piston and vice versa, when the piston is pulled outwards the rubber end will naturally bulge inwards towards the cylinder chamber. These deflections of the rubber end are direct reactions in response to the plus and minus pressures respectively produced in the cylinder chamber by the compression and release of the contents of this cavity.

APPLICATION OF PRINCIPLE.

Having grasped the significance of the above mentioned experiment, let us see how it applies to the eye. Consider, if you please, both lids together as the walls of the sliding piston of our glass syringe which we mentioned as opened at both ends. One opened end is the palpebral fissure and the other end closed by the bulbar conjunctiva and cornea corresponds to the rubber membrane as above explained. This resemblance becomes quite evident when both lids are retracted together and traction is made on them. The closed cylinder chamber finds its equivalent in the closed conical bony orbit containing the eyeball, but with the additional advantage that Nature has provided that the equivalent of the rubber membrane stretched over the

lower end of the glass piston is none less than the anterior hemisphere of the eyeball, including of course the sclera and the cornea.

It has been furthermore very happily disposed, that because of the intimate attachment of the conjunctiva with the corneal margin, the cornea can be incised without affecting this airtight connection which, of course, would be impossible if an incision were made in the rubber membrane of our theoretic syringe.

TECHNIC

It is well that one should be provided with an eye speculum similar to that of Professor de Lapersonne, which is equipped with two articulated curved and molded blades that fit nicely under the lids without much tendency to slip, and have the added advantage that because these blades are hinged loosely so as to move in a perpendicular plane with the arms of the speculum, these arms may be rotated backwards or forwards from the face to any degree without displacing the position of the blades under the lids. This item is very important for proper results.

After the corneal incision is made, the assistant takes hold of the free end of the speculum; and following closely the operator's movements, applies a constant and steady pull on the lids. I mean by this, that a considerable traction is exerted, not only with a view of avoiding that the speculum touches the eyeball, but with the intention of placing the lids on the stretch, so that through their action on the conjunctiva transmitted to the eyeball, the benefit of this practice may be obtained to its full extent. Sufficient tact should, however, be exercised to avoid slipping of the blades.

Whilst traction is being exerted, the speculum should also be displaced either upwards or downwards toward the cheek, endeavoring always to furnish the operator a clear and unobstructed view of his field of operation. It will now be observed that in the majority of cases, the moment this traction on the lids is applied, after the cornea has been incised, the cornea collapses to a greater or lesser extent.

In such cases in which the cornea does not appear to be distorted, you know, nevertheless, that a minus tension is being produced in the eye, and that because of individual differences of elasticity, some corneas collapse easier than others. When traction is released the cornea resumes its shape. The observance of this change of pressure as a resultant of lid traction, is very gratifying to one's mind during cataract extraction, as it gives one a sense of security. No matter what technic one may employ, or what method of extraction, it is surprising to observe to what extent one can manipulate an eye without any tendency to escape of vitreous.

If the operator is ambidextrous and therefore stands or sits at the head of the patient whether operating the right or left eye, the assistant should stand at the left of the patient for the right eye and hold the speculum with the left hand, passing his arm over the patient's chest. The operator is thus free to move about as he sees fit. When the left eye is operated, the assistant stands at the right side of the patient and with the right hand over patient's chest, manipulates the retractor from this side, also leaving the operator free to move as he may desire.

If the operator is not ambidextrous and stands at the left of the patient when operating the left eye, then the assistant should stand at the head of the patient and hold the speculum with his left hand. These maneuvers may of course be modified to suit the individual needs.

WHEN SHOULD LID TRACTION BE EMPLOYED

My answer is, that from the moment the cornea is incised, lid traction should be applied and maintained up to the final dressing.

Lid traction is particularly advantageous:

1. In vitreous prolapse.
2. In intractable patients.
3. In intracapsular extractions.
4. In dislocated lenses.

5. In replacing the iris.
6. When using wire loops or spoons behind the lens.
7. In extracapsular extractions.
8. In eyes with a plus tension.
9. During the performance of the toilet of the anterior chamber.
10. In extracting soft cortical matter.
11. When the lids have been previously injected with novocain.
12. To offer an unobstructed view of field to the operator at all times, without calling on the patient to look down.
13. To avoid effect of orbicularis spasm.
14. In fact, generally speaking, at any time that the interior chamber has been opened for any reason.

In order that lid traction should be thoroly effective, please understand that I invariably mean traction on both lids simultaneously. If the upper lid is hooked alone whilst the lower lid is pulled downwards and pressed against the orbital margin, as in the Smith-Indian operation, it can be readily observed that only a portion of the effect is obtained, as the traction of the upper lid is counteracted by the pressure on the lower.

As a fitting climax to the similie existing between the syringe as I analysed at the beginning of this study, and the action of the lids, if we use compression instead of traction, there should be an increase of orbital and ocular tension. This proposition is so self evident that it should need no demonstration; however any manometric observation will prove it.

A very useful and practical application of this effect is adaptable in the performance of enucleations. After the conjunctiva has been incised around the cornea and all muscles and the optic nerve have been divided, exert a sudden and forcible pressure on the eyelids towards the apex of the orbit, either with the fingers or thru the speculum blades, and the eyeball will "pop" right out of the orbit making it easy to finish dissecting small tags and adhesions.

I can most forcibly and sincerely recommend the practice of lid traction and would be pleased to hear of results obtained by others thru its use.

350 Post Street.

IMPROVED TECHNIC FOR IRIDECTOMY FOR GLAUCOMA.

GEORGE FRANCIS SUKER, M.D., AND

BEULAH CUSHMAN, M.D.

CHICAGO, ILL.

The operation here described is a broad iridectomy reaching to the root of the iris. The different steps in the operation are pointed out and the advantageous results obtained are given. Read before the American Academy of Ophthalmology and Oto-Laryngology, October, 1925.

It is not the purport of this paper to discuss pro or con the indications for any of the modern operations for glaucoma of any type or character, but to limit the remarks and discussion to iridectomy when the same is the choice of operation for glaucoma.

From a rather large experience, we have concluded that the broad and deep iridectomy is the one operation which yields prompt and lasting reduction in tension, and maintains the visual acuity and fields as safely and definitely as any operation. By a broad iridectomy we mean a liberal one. By a deep iridectomy we mean one that reaches to the very root, even up to, if not attacking the peripheral ciliary mechanism.

The operation about to be described advances no strikingly new principles but employs several principles used in other operations for glaucoma. Unless the technic is carried out in every detail as described, this operation does not offer anything new, nor any better results than the "usual" iridectomy.

DESCRIPTION OF OPERATION

1. Make a curvilinear conjunctival section, about midway between limbus and superior rectus insertion, with convexity toward the cornea. A section similar to that for an Elliot trephine. With such a flap, one secures a better coaptation and less retraction downward (Fig. 1).

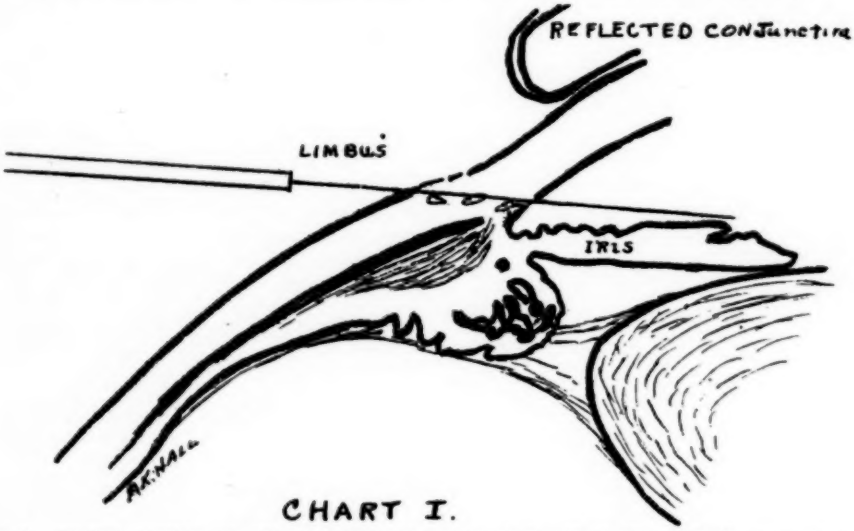

Chart I. Radial section of ciliary region showing conjunctival flap folded over corner and knife in position making corneoscleral incision.

2. Catch flap firmly with broad fixation forceps.

3. Dissection of this conjunctival flap close down to sclera, preferably with a knife.

4. Extend dissection well over and beyond limbus, but not splitting cornea (Fig. 2).

5. The width of this dissection at limbus should be ample enough to at least give 6-8 mm. of free limbus (Fig. 3).

6. With cataract knife enter anterior chamber perpendicularly, at a point at least 1-2 mm. beyond limbus, at either end of exposed area. The knife blade is anterior to iris surface

and penetrates into anterior chamber about 1 cm. (Figs. 1 and 3.)

7. Complete the section by an upward saw draw cut, along this retrolimbal line to point opposite entry, making a section of 6-8 mm. long. This is virtually an anterior sclerotomy section.

8. This makes a shelving serrated cut with an inclination upward and backward, practically within sclera and thru scleral spur, thus being very near root of iris (Figs. 1 and 3).

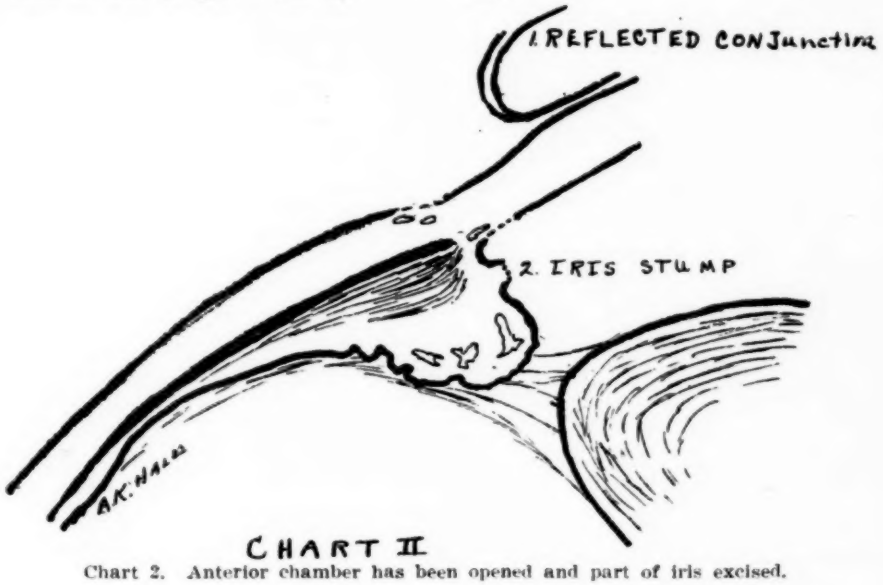

Chart 2. Anterior chamber has been opened and part of iris excised.

9. With forceps grasp iris midway between pupillary edge and periphery.

10. Draw iris downward and forward at one angle of the section in a direction toward the cornea, or over limbus.

11. Make a small nick into iris close to upper edge of section, then for a firmer hold, if necessary, grasp iris back of first forceps.

12. Continue this drawing and nicking until opposite end of section is reached when iris is gently drawn in opposite direction and entirely severed. This latter point avoids iris incarceration at angle wound.

14. In nicking the iris with a fine iris scissors attempt to have one blade of scissors skirt underneath the upper scleral edge so as to pierce the iris in cutting. Repeat this in making each subsequent nick.

15. Replace conjunctival flap and with spatula stroke same definitely and firmly into place for good coaptation. Sutures are seldom indicated.

16. Instil one drop of 1% atropin, if you wish.

17. Bandage eye as is your custom.

18. Within 36-48 hours, if feasible, dispense with occlusive bandage.

Some advantages of the operation are:

1. Conjunctival flap.
2. Cicatrix not in corneal tissue.
3. Iridectomy involving root.
4. Broad iridectomy.
5. A serrated sclerocorneal section favoring filtration scar.
6. Prompt healing.
7. Tension reduced and seems to remain so.
8. Miotics have not been necessary afterwards.
9. Late infection reduced to a bare possibility.

The essential steps to be closely followed are:

1. The making of the conjunctival flap.
2. Entering anterior chamber at a point 1-2 mm. from limbus in sclera.

3. The upward slant of a serrated scleral section.

4. The drawing of the iris downward over the cornea and thereby allowing some iris pigment to adhere to the section, which favors the formation of a filtering cicatrix.

5. The nicking of the iris underneath the scleral edge.

6. The successive traction downward of iris and the successive nicks,

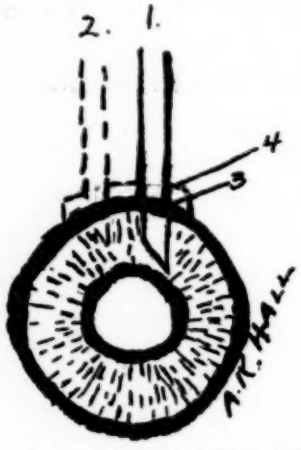

Chart 3. View of parts involved from the front. 1. Point of entry. 2. Point of exit. Incision 6-8mm. long (serrated). 4. Entry point 1-2 mm. back of limbus in sclera.

thus not tearing the iris and favoring the above deposition of pigment.

7. Some iris pigment must remain attached to scleral wound, for reasons above suggested, for favoring a filtering cicatrix.

When the operation has been performed as described and the eye is examined within 24-48 hours, you can readily see the suspensory ligament edge of lens in the coloboma. The pillars are absolutely free and never incarcerated and you have a free filtering angle. In some cases even the ciliary organ can be seen.

It is quite advantageous to precede the local anesthesia by one or two injections of scopolamin (gr. 1/150) and morphin (gr. 1/6). This anesthesia seldom if ever fails to relieve any operative pain and insures rest thereafter.

In cases with an obliterated anterior chamber, the scleral section can be made in a manner similar to the method in cyclodialysis.

From our description of the operation it is very obvious that it is the technic and not so much the principle that is different from other iridectomy operations.

The description for this technic is based upon ten recent cases, which include hemorrhagic, absolute, simple chronic, inflammatory, secondary glaucoma and buphthalmos. We did operate in this manner, but never reported it, at the time Elliot's trephining became popular, which we then adopted and did not again revert to the operation described until about a year ago.

We wish herewith to thank Dr. Alice K. Hall, Chicago, for the several very illuminating illustrations.

25 E. Washington St.

NOTES, CASES, INSTRUMENTS

HOW TO AVOID TOXIC SYMPTOMS FROM HOMATROPIN.

WM. H. CRISP, M. D.

DENVER, COLO.

Every ophthalmologist has occasionally encountered in his patients disagreeable systemic affects from the use of homatropin for cycloplegic purposes. These disturbances may occur in any one, altho there are some patients who seem to have a hypersensitiveness to the drug, just as there are patients who are extraordinarily intolerant of atropin. In some the disagreeable effect is limited to marked flushing of the cheeks, in others there is a sense of nausea, or the gait is unsteady, or the patient (especially if a child) is so restless as to render examination difficult.

After observing these undesirable consequences a number of times, it occurred to me that they might have some relationship with emptiness of the stomach. It is common knowledge that drugs which have an irritating effect upon the gastric mucosa are

better given after a meal; for example, sodium salicylate. I therefore gradually acquired the habit of requesting my patients, especially if they were women of sedentary and nervous habit, to take lunch before coming for instillation of homatropin; or, if the drops were to be used in the morning, to be sure that a fairly substantial breakfast had been taken at a moderate interval of time before the drops were to begin.

Since adopting this practise, I have never seen any of the disagreeable effects previously referred to, except in one or two patients to whom I had forgotten to mention the matter, and they of course have only served to demonstrate the truth of the principle.

I feel that the suggestion is worth publishing, because the idea was apparently new to a number of oculist friends to whom I have spoken of my experience. A little while ago I mentioned it to Dr. Edward Jackson, and in a later conversation he told me that he had just recently had a case of systemic disturbance from homatropin in a young woman who he found was in the habit of taking practically no breakfast (coffee and grape fruit, or the like), and in whose eyes the drops were instilled in the course of the morning.

The disagreeable taste of homatropin, complained of by a good many patients, is of course due to escape of the drug from the conjunctival sac through the lacrimal drainage apparatus into the nose, on into the nasopharynx, and thence to the taste buds at the back of the tongue. It is clear that in a number of cases a fair amount of the drug rapidly reaches the stomach, where, if this organ is empty, not only may the homatropin disturb the local nerve endings, but it passes quickly into the general circulation.

530 Metropolitan Building.

A NEW METHOD (SUCTION) FOR THE REMOVAL OF FOREIGN BODIES ON THE CORNEA.

SIDNEY ISRAEL, M. D.

HOUSTON, TEXAS.

In the removal of foreign bodies on the cornea, one is often confronted with the tediousness of the effort, and in addition, a most unsightly appearing corneal surface produced by the instruments employed in removal, specially if viewed with high magnification, or corneal microscope.

In order to eliminate the above objectionable features, I have devised a small glass tube to be connected to any form of suction device, preferably the small water suction cylinder that attaches to any faucet, as it is the most inexpensive and efficient. With this suction tube the majority of all foreign bodies lying on the cornea can be removed, and the time required in removal is only a fraction of the time consumed in the usual way with a foreign body spud. There is no trauma or abrasion of the corneal epithelium and no disability as a result.

Fig. 1. Instrument for removing foreign bodies from the cornea by suction (Israel).

Practically all character and kinds of foreign bodies have been removed with this method. Of course, one cannot remove stains. In foreign bodies deeply imbedded, the suction method will facilitate ready removal by loosening, or making the foreign body easier to extract.

The technic is the same as in the removal of any foreign body located on the cornea. Viz: Local anesthesia (Holocain 2%). The water faucet is turned full force in order to deliver the maximum amount of suction, and the glass suction tip, after having been sterilized, is connected to the rubber tubing of the suction apparatus. The fine, smooth point of

the glass tip is then brought into absolute contact with the foreign body, and removal takes place as quickly as it takes to read this line.

There can be no injury to the corneal surface as the method is free from any risk or mishap.

The suction, or the amount of suction, is easily controlled by pinching the rubber connecting tube, or with the finger over the hole in glass tip made for the purpose.

The illustration of the suction apparatus and glass suction tip explain themselves.

Second National Bank Building.

OCULAR FINDINGS IN POST-ENCEPHALITIC SYNDROME.

LOUIS LEHRFELD, A. M. M. D.

PHILADELPHIA.

A very interesting finding in cases of Parkinson's Syndrome, is the periodic attacks of *upward deviation of the eyeballs* accompanied by rigidity of the neck and a prolonged retardation in speech effort. This deviation of the eyeballs is conjugate, the eye being turned up so far that half of the pupil is covered by the upper lid. The patient is able, on effort, to move the eyeballs to the right and to the left, but is unable to look down. The spasm of superior rotation may last from five minutes to several hours, sometimes as long as twelve hours. The patient appears to be distressed during the attacks, some complaining of pain and others being extremely nervous and tremulous. The attacks usually end in complete recovery of use of the eyeballs, movement being free in all directions, with the exception that full downward movement may not be entirely regained for several days.

I am told by nurses and orderlies that the attacks of upper rotation of the eyeballs may be terminated by covering the patient's eyes, or by diverting his attention by speaking to him, or asking him to look at certain objects. As one orderly puts it, he can release the upward deviation of the eyes by giving his patient the Sunday comic section to read. I have personally been unable to obtain these results with one patient who remained irresponsive to any command, except to move his eyeballs to the right or to the left. Several weeks later, however, this same patient explained to me that he understood all my directions, but was at a loss to carry them out. A most interesting feature in four of the five cases examined in the neurologic department at the Philadelphia General Hospital is that they were young boys, ages fifteen, sixteen, seventeen, eighteen, and the fifth case a young man thirty-three. All of these gave a history of having "sleeping sickness" from three to six years prior to the onset of upper deviation of the eyeballs.

This aura or spasm of the eyes occurs in the case of the four young boys on the average of once or twice weekly; the older patient aged thirty-three experiences his attacks about once monthly.

In all of these cases there had been noted in the history transitory diplopia which occurred during the acute stage of encephalitis.

The most interesting phase of the ocular spasm is the conjugate upward deviation. This is a rare ocular finding in any form of chronic neurologic disease. At first I was inclined to regard the upper deviation as the result of a paralysis of the depressors of the eyeballs; but such is not the case, if the statements of the nurses and orderlies are true, that the eyeball may be rotated downward on diverting the patient's attention. The theory of paralysis in this condition was considered, because the acute attack of encephalitis is often accompanied by ocular muscle palsies. Certainly I would regard the upper deviation as an irritative process at the base of the brain, involving the nuclei connected with associating fibers which have to do with the rolling of the eyeballs upwards. This spasm simulates the upper deviation of the eyeballs in cases of epilepsy, in cases of unconsciousness resulting from trauma or in the secondary stage of general anesthesia.

All of the five cases examined have more or less pallor at the temporal side of

the discs and there is a general hyperemia of the retina. One patient, a boy of seventeen, has a distinct optic atrophy. I believe that all those presenting a distinct temporal pallor are in the stage of early optic atrophy. Verification by the perimeter is impossible in these cases, because of the tremor of the head and impediment in speech.

1321 Spruce Street.

BREATH SCREEN FOR SLIT LAMP WORK.

CECIL STOCKARD, M. D.

ATLANTA, GA.

Mr. Basil Graves, during his course of slit lamp instruction in Philadelphia last Spring, suggested the use of a screen to protect both doctor and patient from each other's breath during the examination. He said the need for this was particularly noticeable in examining a talkative patient who had been eating onions or garlic.

Immediately upon my return home I began to design such a screen, the method of attaching it to the microscope being predetermined by the structure of the Zeiss machine. Formerly, in using the corneal microscope the illumination was furnished by a movable light sliding on a metal arc, the stem of which was inserted into a hole just below the objectives and held in place by a large set screw just above the microscope. Since the introduction of the slit lamp this method is no longer used, but for some reason the Zeiss instruments are still made with this hole and set screw, and these I made use of to attach the screen, which I have used for some months with satisfaction.

The illustration is largely self explanatory. The apparatus consists of three parts. First, a wooden peg about 5 cm. long, to fit in the above mentioned hole, a small knob on the end of the peg keeps the clip from slipping off; second, a metal clip, easily fashioned from a wire "Gem" paper clip; and third, the screen itself. This is made of transparent celluloid, 1 mm. thick and 15 cm. square, with corners trimmed off as shown. As such a large piece is removed from each upper corner, plenty of room is left for the focusing lens to move close to the microscope and the loose attachment of the clip to the peg allows the whole screen to swing aside if necessary. I think a thinner piece of celluloid would perhaps be an improvement, but less than ½ mm., I believe, would be too thin to hold its shape properly.

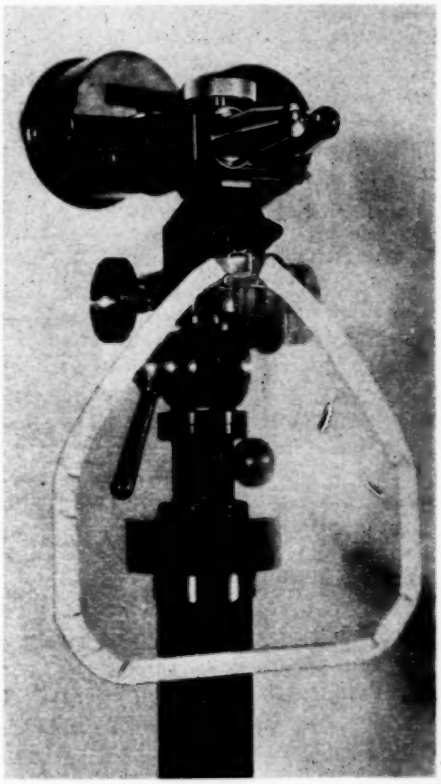

Fig. 1. Breath screen for slit lamp work.

Suite 1121 Candler Bldg.

SOCIETY PROCEEDINGS

THE ROYAL SOCIETY OF MEDICINE, LONDON, ENGLAND

Section of Ophthalmology.

December 11th.

SIR ARNOLD LAWSON Presiding.

Metastatic Inflammatory Deposit in Cloquet's Canal.

MR. MALCOLM HEPBURN showed a woman, aged 33, who had this condition in both eyes. In April, 1923, she came to hospital complaining of misty sight in both eyes following a poisoned foot and pyorrhea. No view of the fundus of either eye could be obtained, but a white hazy mass occupied the central part of the vitreous, and seemed to be connected with the disc behind. On this day of the meeting the fundus could be seen clearly at the periphery, for the first time, but the center was still occupied by a white mass of organized exudate. Her vision remained much the same. If this had been hemorrhage, Mr. Hepburn thought it would have moved ere this, and there would have been a quicker clearing up. He feared there would be a shrinking of the vitreous, and he asked the views of members as to the prognosis.

The President said he formed the opinion that it was probably a septic condition.

Central Retinitis.

MR. A. C. HUDSON showed two cases of this condition, in patients aged respectively 41 and 43. The first, a post-office sorter, had had severe pain at the back of the right eye since 1918 in attacks lasting about 45 minutes, also pain in the temples. All his teeth were removed for pyorrhea in 1920 and 1921. No history of nose and throat disease, nor of venereal disease. There was apparently a calcification of the retina in the macular region and some disturbance of retinal pigment, also there were a number of minute bright dots scattered over the foveal region. Mostly this condition was unilateral, but at least one case he had seen was bilateral. There might be a generalized thickening of Bruch's membrane. In many of these cases the vision was not seriously affected. Some of the cases, however, complained not only of defective vision, but of seeing thru a violet haze; one said he seemed to be looking thru a green veil. These were very difficult cases to treat with confidence; several had been in the hands of throat surgeons, who gave the patients iodid of potassium by the mouth. The sight seemed to remain much the same after weeks, or even months, of treatment.

White Mass in the Macular Region.

MR. HUDSON showed a girl, aged 11 years, who had a white mass in the macular region, and two other white masses in the periphery of the fundus below. He thought it was due to an external hemorrhagic retinitis, the condition Coats described and collected cases of. During the two years he had been seeing the patient the condition had not altered in appearance. The child had never had whooping cough, and Mr. Hudson could not find anything to connect causally with the condition.

Discussion. MR. GRAY CLEGG regarded it as a form of Coats' disease.

The President said that hemorrhages in the retina were not very uncommon in children. In one case of bad retinal hemorrhage he had, in a boy aged 15, the cause was evidently masturbation, and when that was checked the hemorrhages disappeared, and acute vision returned.

Band Shaped Opacity of Cornea.

MR. HUDSON showed a patient with this condition. In each case of this condition he had had he scraped away the opacity, and there was very little reaction, and convalescence was satisfactory, healing taking place in about a week. Vision in this case improved from 6/18 before the operation to 6/9.

Ichthyosis of Skin, with Ectropion.

MR. HUDSON's next case was one of severe congenital ichthyosis of the skin with ectropion. The left eye had extensive chronic keratitis in a very irritable state, and it looked as if it would extend and cause the loss of the eye, the other having already been com-

pletely destroyed. Tarsorraphy seemed to be out of the question; there was so much tension on the skin that it did not seem likely that union would take place. It seemed a suitable case for a Thiersch graft, if a suitable site could be chosen from which to take the skin. He chose the outer surface of the patient's arm, but the skin, instead of being supple, had a parchment like consistence. However, when it was removed, a bleeding surface was left, therefore it was clear that the graft contained living cells. The graft took very well; it had now shrunk somewhat, but the condition was now much better than before the operation, and the eye was satisfactorily closed when the man was asleep. He did not think a graft taken from some other person would have taken.

Black Cataract.

MR. HUDSON next showed two cases of black cataract. When seen, the pupils of one of the patients were widely dilated, and obviously she was very blind. With the light from the window he saw a pearly-grey reflex coming from behind the lens. The patient said that twenty years ago she had a severe blow on the right eye, and lost the sight of it two years afterwards. In the left eye there was not only an active pupil, but also good projection of light, and the ophthalmoscope showed a pearly reflex, like that of detached retina. He therefore extracted the cataract. There was an enormous lens, almost the color of a prune. She did very well afterwards, and in spite of having had choroidoretinal degeneration, probably as a result of myopia, she now had 6/18 vision without glasses. The other case of this condition, in a man, had no fundus disease at all.

Discussion. MR. GRAY CLEGG spoke of a similar case he had recently, in which he removed the lens, and of the sheen he saw. He agreed that such cataracts might occur in healthy eyes.

The President agreed with Mr. Clegg's last remark.

Neurofibromatosis with Buphthalmos and Keratectasia.

MR. HUDSON showed a man with this combination, the neurofibromatosis affecting the fifth nerve. He thought the injection and irritability of the eye indicated that it should be excised.

Cyst of the Iris.

MR. P. G. DOYNE showed a woman, aged 46, who attended hospital and asked for an operation. On dilating the eye, a dark cystic condition became apparent on the lower and outer third of the iris, forming a chord of the arc of the pupil in that region. It seemed to be a cyst of the retinal portion of the iris, and was more or less translucent. Tension was normal.

Discussion. MR. GRAY CLEGG said there was an exactly similar case in his hospital, still under observation, and in many months there was no sign of change. It was a question whether at this stage operative interference ought to be undertaken. Cysts of the iris were not very satisfactory to deal with.

MR. T. HARRISON BUTLER suggested that the appearance was more like that of foreign body than cyst; the straight line taken by this condition did not suggest cyst to him.

MR. DOYNE replied that the border was rounded, and it had a translucent look. It was transilluminable at the limbus.

Double Leucoma Adherens.

MR. HUDSON demonstrated for his colleague, Mr. K. G. W. Saunders, a case of double leucoma adherens. It was shown as a curiosity, and Mr. Hudson said he thought it was unique. Contrary to expectation, the eye showed no increase of tension.

The meeting passed a cordial vote of thanks to Mr. Hudson and Mr. Doyne for having provided such an instructive series of cases.

H. DICKINSON, Reporter.

THE BROOKLYN OPHTHALMOLOGICAL SOCIETY.

October 15, 1925.

DR. RALPH I. LLOYD, Presiding.

Injury to Macula with Subsequent Secondary Glaucoma.

DR. C. HARGITT reported a case of a young woman who had been struck in the left eye with a basketball in 1915, resulting in blindness after nine months. In July 1925, she presented herself with ciliary injection, wide

pupil and tension markedly increased. Transillumination was negative. The pupil did not respond to pilocarpin and Dr. Hargitt thought the eye should be removed. Dr. Lloyd had seen the case in 1915, some months following the trauma. The patient had consulted several oculists, who had made a diagnosis of hysteria. With the aid of the Bishop-Harman diaphragm test Dr. Lloyd was able to show that the patient depended entirely on the right eye. He was also able to demonstrate a large central scotoma, definitely proving the existence of macular disturbance.

Juvenile Glaucoma.

Dr. W. Moore reported a case of glaucoma following the use of homatropin for refraction in a woman of 36. The patient was first seen November 26, 1921, complaining of pain in and about the left eye, with poor vision at night. She was wearing +3.00 sphere for each eye. The lenses gave no relief. The intraocular tension did not seem high. Because of the poor vision at night, retinitis pigmentosa was suspected. She was given 1/40 grain tablet of homatropin in each eye. At the end of one hour, mydriasis and cycloplegia were complete. Fundus examination was negative; media were clear, retinoscopy showed +4.00 sphere each eye. Eserin was instilled into each eye. The following morning there was great physical distress—vomiting and severe pain in left eye. Tension right eye normal; left eye markedly increased. Eserin and morphin were given hypodermically. Miotics had no favorable effect and operation was advised, but was refused. Several days later, coincident with onset of menstruation, pain became worse and iridectomy was performed Dec. 2, 1921. Later examination showed vision 3/60, not improved, and almost total absence of visual field nasally. Five months later there was a history of sudden blindness in this eye over night.

Glaucoma in a Patient Aged 30.

Dr. Robert M. Rogers reported a case of glaucoma in a patient of 30, who complained of failing vision of the right eye. This eye showed light perception; the left, 15/200. The pupils were wide, the anterior chamber shallow, the corneae hazy and the tension 110 (McLean) in each eye. A solution of 2% pilocarpin and 1% eserin was used every hour. Two days later the tension of the right eye was 45; the left eye, 35. The field at this time showed marked contraction, the nasal side being principally involved. Operation was advised, but was refused. Subsequently adrenalin was injected subconjunctivally on three different occasions. No permanent benefit resulted. Later, following a return of high tension, Elliot's trephine operation was performed on one eye. Patient made an uneventful recovery with very good restoration of vision.

Glaucoma in Younger Patients.

Dr. Henry H. Waugh became interested in this subject several years ago, after having heard statements that patients under 40 could not have glaucoma. On investigating he found that this was not the case. He quoted Haag's analysis of 1,032 cases of glaucoma, showing that in the third decade there were 26 cases, in the fourth, 74, in the fifth, 176 and in the sixth, 288. He thought the incidence of glaucoma in the fourth and fifth decades might be explained by the changes occurring in the lens at this time of life. Priestley Smith estimated that the lens at 65 is one-third larger in volume than at 25. In younger patients simple glaucoma is more prevalent than congestive glaucoma. The former are more apt to be associated with myopia; the latter with hyperopia. Heredity is a factor in very young cases. The earliest symptoms are intermittent blurring for near, and sometimes, for distance. These patients require reading glasses before the presbyopic age because of a failure of accommodation. Another early symptom is photophobia. There may be transient steaminess of vision present for a short time on arising in the morning. Halo vision seems to be an accompaniment of high tension—50 or more, measured with the Schiötz tonometer. In the earliest stages of the disease there are periods in which the tension is apparently normal and

homatropin might not cause any inconvenience. The slit lamp may prove to be of value in determining glaucoma in its early stages, but sufficient reliance should be placed on a study of the visual fields and blind spots. The absence of changes in the blind spot and paracentral area are conclusive evidences against the diagnosis of glaucoma.

WM. F. C. STEINBUGLER,
Secretary.

OMAHA AND COUNCIL BLUFFS OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SOCIETY.

DR. S. D. MAIDEN, President.

NOVEMBER 18, 1925.

Concussion Injury.

Dr. C. M. Swab presented a case of concussion injury of the eye. The left eye had been struck by a board about six weeks before. At the first examination the eye was greatly congested. Blood in the anterior chamber prevented a view of the fundus. The pupil was dilated. He was hospitalized for four days after which time the blood absorbed and the ophthalmoscope showed three choroidal hemorrhages and a small laceration of the iris sphincter. These suggested a Vossius' ring in appearance, but the ring was not complete. At present vision is 20/30+4. The opacities in the lens capsule have cleared up. The fundus picture is about the same.

Coloboma of Lower Lid.

Dr. Harold Gifford showed photographs of a case of congenital absence of half of the nose associated with coloboma of the lower lid and dacryocystitis. The X-ray showed complete absence of the ethmoid cells and the antrum on the same side. To cure the suppuration the lacrimal sac was destroyed. It was proposed to wait until the rest of the face had attained its normal growth before attempting to reconstruct the nose.

Panophthalmitis after Trephining.

Dr. Harold Gifford also reported one case of late infection with panophthalmitis and loss of the eye after trephining. Out of a large number of trephinings, he has seen only four cases of severe late infection in which the eye was lost. In several cases which were seen promptly, local cauterization has stopped the infection and the eyes have been saved. He always instructs patients after trephining, to use a weak zinc collyrium regularly twice a day for the rest of their lives since this lessens the likelihood of pathogenic bacteria remaining in the sac. Two of his infections have been in patients who had stopped this treatment. In two more, including the present case, the late infection occurred in spite of the more or less regular use of the collyrium.

Conjunctival Flap for Corneal Wound.

Dr. Sanford Gifford presented a case of a man who had received a severe cut with a piece of glass three months before. The cut was across the lower third of the cornea extending well into the sclera on either side. The lower half of the iris was prolapsed. A bridge flap was drawn up from below. The iris was excised. The lower half of the cornea was touched thoroly with trichloracetic acid and the bridge flap fastened with sutures to cover the wound. He was kept in the hospital for five days. Three months after the injury, the vision in the injured eye was 20/70, with —1.00 sph. ⊃ + 2.00 c.x 15° V. = 20/25—2. The advantage of a bridge flap over the ordinary sliding flap to cover the wound in this situation was mentioned.

Injuries of the Fundus Oculi Due to Direct Contusion.

Dr. Swab read a paper on this subject.

Discussion. Dr. Patton emphasized two additional points. First, the occurrence of detachment of the retina a long time after any fairly severe contusion of the eye even when no sign of detachment was present at first examination. He emphasized the importance of keeping the eyes absolutely quiet for at least a week following any serious injury, which can only be done by a binocular bandage. Second,

traumatic dislocation of the lens presents a serious problem as to whether or not to attempt extraction of the lens. The possibility of secondary glaucoma in these cases should be kept constantly in mind.

Dr. J. M. Banister emphasized the frequency with which ruptures of the choroid occur after contusion often resulting in serious damage to vision. They are usually semilunar with their concave side toward the disc and located near the macular region. The reason for this shape is probably due to the rigidity of the optic nerve, and the other softer structures of the eye being pushed back against the stiffer nerve and being ruptured at their weakest place.

Dr. Harold Gifford brought up the question as to whether the usual name, choroidal rupture, is a good one. Usually the cases are not seen before the pigment displacement has more or less changed the picture and he knows of no exact observation of sections in these cases. Probably a rupture of the external layers of the retina always occurs with socalled choroidal ruptures. The white streaks seen in the area of the rupture, usually supposed to be the sclera, may be an unusually dense scar tissue. It seems doubtful if the rupture of the choroid alone could cause the serious disturbance of vision usually seen in these cases. The prognosis in these cases is usually bad if they occur near the macula. He mentioned, however, a case seen with Dr. F. S. Owen in which vision returned after several months from 20/100 to 20/30. In one case which he saw, five concentric ruptures were present. He mentioned another injury of the eye, rupture of the cornea by contrecoup, that is by injury to the posterior segment of the globe. He also emphasized the importance of late detachment, relating one case in which detachment occurred eleven years after the injury when the patient had settled his claim against his employer for a small amount long before.

Dr. F. W. Dean mentioned one case of choroidal rupture which he saw from an unusual cause, a sparrow having flown against the patient's eye.

Dr. J. J. Warta brought out the frequency of choroidal rupture in boxers. It is stated that 60 to 70% of professional boxers develop a cataract and a smaller percentage, detachment of the retina.

Dr. Harold Gifford advised that settlement in cases of severe injury should always be made on a contingent basis.

Dr. Swab in closing stated that in view of all the possibilities of danger to the eye after any contusion, every possible prophylactic precaution should be taken in each case. This should consist in hospitalization if possible, or at least rest in bed until repeated examinations showed the absence of serious lesions. While ruptures usually occur on the temporal side of the disc, he has also seen them on the nasal side.

Dr. James M. Patton opened a discussion of compensation for ocular injuries. He gave a condensed summary of the recommendations made by the committee on ocular compensation of the Ophthalmic Section of the American Medical Association. In this discussion representatives of two insurance companies having to do with a great deal of medicolegal work were present, and Mr. Larson, Commissioner of the State Compensation Board.

Mr. Rance, representing the Foster-Barker Insurance Company, stated that where late detachment occurs following an accident after the claim has been settled, the case can always be reopened if sufficient evidence is obtained that the award was insufficient. He states that higher amounts are paid in claims under the Nebraska compensation law than in any state of the union except California.

Dr. Mullins asked if a case can refuse to accept the award from the state compensation board and appeal for a new trial.

Mr. Larson of the State Compensation Board said that in case it is decided that the award has been too low, there is no chance of obtaining a jury trial under the present law. The claimant can only appeal to the Circuit Court, and ask that his case be reopened. Mr. Larson would welcome

any plans by which reports of examiners could be made uniform, as a difference between reports of different examiners in any case is one of the greatest causes of confusion in making the awards. In a case which was examined a week before, vision of 20/40 and 20/70 was reported by two equally reliable oculists and it was necessary for the commissioner to strike an average between these two figures. The cases of malingering are often puzzling and fool many oculists.

On account of the present distinction between loss of vision and loss of eyeball, he knew of two cases which had been given awards for loss of vision in one eye and when later the eyeball had to be removed, were compensated again for total loss of the eye. Altho slight injuries to the eye may not incapacitate an employee from doing his present work, in case of a change of employment the inconvenience in obtaining and holding a new position may be serious.

MR. CONNOLLY, representing the Harry Koch Insurance Company, in answer to a question told how the compensation law provides for a man who is waiting for a cataract operation. Upon a report being turned in by the examining physician of total industrial blindness in the eye, 125 weeks pay is allowed. If after one year an operation is possible which restores or improves vision, a corresponding change may be made in the award.

It was moved and seconded by Dr. Lindquest that the Society indorse the report of the Committee of the American Medical Association and that its members try to make its reports in medicolegal cases on the basis of the plan proposed. The motion was passed.

S. R. GIFFORD, Secretary.

MINNESOTA ACADEMY OF OPHTHALMOLOGY.

December 11, 1925.

DR. D. L. TILDERQUIST, Presiding.

Double Paralytic Divergent Squint.

DR. JOHN F. FULTON reported the following case. Mr. C. J., colored, widower, aged 58, came under observation during the month of July at the Wilder Free Dispensary, with the following history.

His parents were slaves in Missouri and he knows but little of their history. His average weight is 167 pounds at the present time; he has weighed as much as 225. As a rule he has enjoyed robust health and has been a hard laborer. He has had a mild attack of diphtheria and one of smallpox, and recovered from both satisfactorily. When a boy of 19, he contracted syphilis in Chicago and was treated for a time by Dr. Kamp of that city. The internal rectus of his left eye became paralyzed in 1911 following terrific attacks of neuralgic pain. Several years after this the internal rectus of the right eye became paralyzed also, so that at the present time there is a divergent paralytic squint in both eyes. Vision in each eye is about normal, 20/30. There never has been any paralysis of the intrinsic muscles of either eye, the paralysis being confined to the muscles of convergence. He was referred to the venereal department and they found a plus 4 Wassermann reaction. He is now under treatment in that department. He was brought before the Academy for study and consultation.

Discussion. DR. EUGENE STROUT thought this was a very interesting case and stated that the patient, in order to fix with either eye, had to turn his head at an angle of 45 degrees. There evidently must be a marked contracture of both external recti muscles. He suggested that tenotomy of the external rectus muscle of one eye might allow this eye to assume a position more nearly in the median line. And if this was not sufficient, a tucking or advancement of the internal rectus should be done later.

DR. WAGENER stated that his experience with these cases in an operative way was not very great, but that it had seemed, at least in his experience at the Mayo Clinic, that most of those which were luetic in origin would clear up with antiluetic treatment. He said in the question of operating, the alteration in the final position of the eyes

after treatment would have to be considered. He said another difficulty to be kept in mind in operating is that, in the present position of the patient's eyes, he very probably does not have diplopia, the point of fixation of the two eyes being too far apart. Any operation which materially corrects the position of the eyes is apt to reestablish the diplopia which is not then easily overcome.

Dr. Strout said it seemed to him that the divergence of the left eye was so marked, that if tenotomy allowed the right eye to come back into line, the patient still would not have diplopia. He felt that it was hardly probable that any course of treatment in a case of such long standing would restore the paralyzed muscles.

Dr. Fulton stated that, so far as appearance is concerned, he thought that a great deal could be accomplished by an operative procedure consisting of free tenotomies of the external recti muscles to overcome the secondary contraction which takes place in these muscles under such conditions, and the shortening of the internal recti by the tucking method. The patient, however, refuses to give his consent to any kind of an operation, and at the present time is under antiluetic treatment and reports to the eye clinics of the dispensary as an observation case.

Dr. Watson thought after looking at the man's eye, that he had almost complete paralysis of all the muscles except the external rectus, and he did not know whether one could accomplish much by dividing the external muscles.

Dacryocystitis.

Dr. John F. Fulton presented the case of a lady, 32 years of age, suffering from a pronounced dacryocystitis on the right side and a partially occluded canaliculus. Dr. Fulton stated that this is a very important subject, which is not receiving the attention at the present time that its importance demands. Stenosis of the lacrimal passages is much more frequently met with than was formerly supposed. A great many of our chronic catarrhal conjunctival irritations and inflammations are due to this, resulting in that most annoying condition of constant epiphora. As pointed out by Sondermann in a recent paper, the valves and folds described in our textbooks are not physiologic but pathologic in character, and Dr. Fulton agreed with this author in declaring that the poor results obtained by probing are due to the fact that their use is commenced with the disease too far advanced or to faulty manipulation. When the small probes are adhered to and skillfully used, and resorted to at proper intervals, they are the most highly beneficial procedures at the disposal of the ophthalmologist. Dr. Fulton said that they had had quite a large number of these cases in their dispensary work recently. They never slit up the canaliculi, use only the small probes, rarely even going beyond number 4 Bowman. As a preliminary, the probe is dipped into a 2 per cent solution of mercurochrome. This procedure is repeated once a week and the patient directed to drop mercurochrome into the corner of the conjunctival sac two times daily, and to massage the lacrimal region at the same time. The results are most satisfactory, and Dr. Fulton said he confidently believed that if this method were followed out in all cases of beginning dacryocystitis it would ward off the chronic form of this unfortunate condition, which up to date has defied the skill of our profession in the way of obtaining successful results by any known surgical or medical procedure.

Discussion. Dr. Rothschild stated that he thought Dr. Fulton's suggestions were very good and that those who were familiar with the work of Schaeffer, who demonstrated the frequently tortuous course of the nasolacrimal duct, would readily realize that it is difficult to use the probe safely in many of these cases. When used early it seemed very effective. Dr. Rothschild said that in addition to using mercurochrome as instillation in the conjunctival sac, the use of the same solution into the sac itself had been tried, apparently with good results.

Dr. Tilderquist said he would like to hear from any one who had used staining fluids in the sac, as to whether there was any danger in doing so.

Dr. Watson stated that there was very great danger in that. He would certainly never use argyrol in the lacrimal sac. He had had one case a good many years ago in which the argyrol spread all thru the tissues of the lower lid and cheek, and it had given him so much trouble that it was a valuable lesson to him. As for mercurochrome, he supposed that it could be absorbed just as readily, but he did not know whether the staining of the tissues would ultimately disappear or not.

Dr. Litchfield said he had had one case in which argyrol had been used before coming to him, to such an extent that the patient had an argyrosis. This was treated with 2 per cent mercurochrome injected into the sac and was cured and the patient did not have any discoloration from the mercurochrome.

Dr. Watson stated that one might frequently inject argyrol into the sac without absorption thru the tissues, but that the very next time it was used this might occur, in fact that very thing had happened in the case he mentioned, as he had made several injections before the one in which the fluid was suddenly diffused thru the tissues. He supposed that same thing might happen in the case of mercurochrome tho he knew nothing about whether or not it could be got rid of. He often wondered now whether the injection of a soluble salt of mercury thru the infiltrated tissues would not entirely remove an argyrol stain.

Dr. Eugene Strout stated that temporary staining from mercurochrome disappears, and he recalled seeing one case of injury to the eyelid where the wound was full of mercurochrome when the patient was brought in, but no permanent staining resulted.

Dr. Litchfield stated that one can inject mercurochrome intravenously and there is no discoloration.

Dr. Tilderquist said that just today he had read an abstract of an article on the use of mercurochrome in the tissues, in which the author stated that he had injected mercurochrome into the tissues to see if the stain would be permanent and that after about three days the stain had disappeared.

Paralytic Mydriasis.

Dr. George F. Brooks presented the case of J. R., aged 9 years, who on July 27, 1925, was hit with an apple in the right eye, at 3 p. m. Patient was seen at 4:30 p. m., vision in the right eye 20/100, left eye 20/15. The right lids were swollen and painful, and there was photophobia and lacrimation. There was a small abrasion of the cornea at "4 o'clock," hemorrhage in the anterior chamber, pupil irregularly dilated and did not react to light. The tension was normal; the fundus could not be seen because of hemorrhage. Atropin was instilled, White's ointment applied, and the eye tied up. On July 28, 1925, the patient was free from pain, right vision was 20/70, the pupil was dilated pear shape, with the base at the bottom. The treatment was repeated. On July 29, 1925, the pupil was more regular, dilated 6 mm. The cornea was healed and the hemorrhage in the anterior chamber was clearing. The treatment was repeated, except that the patient was given dark glasses instead of the pad and bandage. On July 30, 1925, the vision in the right eye was 20/50, pupil 6 mm. and quite regular. On August 1, 1925, the atropin was discontinued. The eye was normal in appearance except for the dilated pupil; the hemorrhage was absorbed and the fundus normal. The patient was seen from time to time and on August 19, 1925, the pupil reacted to light sluggishly and slightly. There was some improvement in this as time went on. The muscles balanced. On August 27, 1925, a drop of ½% eserin contracted the pupil to 2 mm. in fifteen minutes. The patient was put on eserin, ¼ of 1 per cent every 12 hours for one week. As soon as the eserin was discontinued, the pupil dilated again to about 6 mm. but continued to react to light and has improved in this respect to date. The pupil is now about 4 mm. The right eye vision is 20/15. Diagnosis: Paralytic mydriasis. This is apparently one of those cases that will eventually get well.

Ocular and Facial Injury.

Dr. George F. Brooks presented the case of J. S., aged 39, laborer. Family history negative. General health has always been good. On May 14, 1925, he was hit a glancing blow by the handle of a windlass, causing abrasions, contusions, and lacerations of the left frontal region, left side of face, nose and left eye. These injuries were attended by a surgeon and the case referred to Dr. Brooks because of the eye and nose injuries.

The lids and conjunctiva of the left eye were swollen to such an extent that examination was very difficult. The vision of the left eye was shadows only. Complete subconjunctival hemorrhage was present; there was an abrasion of the cornea near the limbus at "6 o'clock," hemorrhage in the anterior chamber filling the lower third; the pupil dilated about 6 mm.; the anterior capsule of the lens crenated, and the fundus too hazy to see, but the lens was tilted backward in the outer, upper quadrant enough to see a part of the retina. After cleansing the eye and using 1 per cent mercurochrome, an ice cap was ordered. Radiographs of the skull were reported normal.

With glaucoma in mind, atropin was not used, but conditions were watched carefully. The eye improved rapidly and by May 19th, (5 days) the anterior lens capsule had cleared enough to see that the fundus was normal. Also the lens seemed to have slipped back into place. However, the iris has persistently been slightly tremulous over the outer half. The vision was 20/100. The patient left the hospital May 20th and reported to Dr. Brooks' office. His muscles balanced on that date, but the pupil remained dilated about 6 mm. and did not react to light or accommodation. On May 23rd refraction under homatropin which was R. —.50 Sph. ⌒ + .75 cx. 105° and L. — 1.00 Sph. ⌒ + 1.75 cx. 75° gave normal vision in each eye.

The left frontal sinus and antrum were dark on transillumination, probably from hemorrhage. These have gradually cleared up. Repeated muscle measurements were taken from time to time and the patient asked about a possible diplopia, but no evidence was found. Eserin would contract the pupil and it was kept up for two weeks. However, as soon as it was discontinued, the pupil returned to about 6 mm.

The patient complained of severe headaches over the left frontal region and referred to the malar and left antrum regions at times; also blurring of vision at times when both eyes were open. Most of this passed away by July 1st, when he was discharged.

On July 16th, the patient returned saying that the night before he began to see double, one thing above the other. He stumbled at times as the sidewalk seemed uneven. There was three degrees of right hyperphoria. The Wassermann was negative. Another set of radiographs showed numerous fractures which were interpreted by Dr. R. G. Allison as follows: Large chip fracture of the external portion of the superior orbital plate on the left side. Slight downward displacement of the malar bone on left, due to fractures as above enumerated. Haziness of the maxillary sinuses, most marked on the right, probably due to old chronically thickened membrane.

The hyperphoria has varied from 1½ to 6 degrees—always more in the afternoon—but usually from 3 to 4 degrees. The pupil remains dilated. Dr. Brooks said he had been waiting for it to get well or become constant at some point where a proper prism could be given the patient for constant near vision.

Discussion. Dr. Lewis stated that fractures around the eyes give many queer findings. One case which he had was a corporation case, with a fracture in the upper part of the orbit. The patient claimed he had seen equally with both eyes and, while the orbital region showed deformity, yet there was no perceptible injury to the eye. When the vision was taken the patient had only 1/10 vision on that side. The uninjured eye was emmetropic, while the eye on the injured side had 12/10 vision with —3.75 Sphere. The patient claimed he had not been nearsighted. He was watched for 6 months and the myopia gradually decreased until the last time Dr. Lewis saw him he had

8/10 vision without any glass and 12/10 with but a small myopic correction. Dr. Lewis said the patient was in the 40's and it was difficult to understand, but he thought the following a satisfactory explanation, i. e., that the fracture was in the upper part of the orbit and there was an exudate that pressed on the eyeball elongating the eyeball and giving him an axial myopia. As time went on the exudate was absorbed, the pressure on the eyeball decreased and the myopia gradually disappeared.

Dr. Lewis thought the inconstant finding of hyperphoria in the case shown tonight might be explained by exudate in the orbit. He thought that to find 4 diopters of hyperopia in the eye and then have it recede to within half a diopter was a queer experience.

Dr. Brown said he saw this case once or twice while Dr. Brooks had him under his care. Dr. Brown had had several similar cases and one case he recalled had hyperphoria. The patient was a man 30 years old, who, in February 1924, had been struck by a taxicab, and when he came to the hospital he had a fracture of the squamous portion of the temporal bone. The case had been taken care of by Dr. Hammond at first, and on February 22nd Dr. Brown had seen him. The fracture for some reason did not heal well and a preauricular abscess formed which had to be opened. Subsequently the patient had diplopia; the vision was 20/25 in each eye. The hyperphoria increased on tilting the head and, in going over the patient with the various tests, Dr. Brown found he had paresis of the left superior oblique muscle. The case ran on for some time with slight improvement, and was lost track of after March 13th.

Dr. Brown thought that in Dr. Brooks' case, the amount of exudate and trauma around the nerve might have produced the paresis; that is, the condition followed the trauma. He said there was another thing which must be thought of in this case, and that was that one side of the face is lower than the other and coordination of the muscles of the two eyes has been interfered with to such an extent that the hyperphoria might be due to that. He knew of no other way in which it could be accounted for except by the deformity, the exudate as Dr. Lewis suggested, and the dropping of the floor of the orbit.

Dr. Lewis stated that he had forgotten to say that the case he mentioned was up before the Industrial Commission and that if the patient had been awarded compensation after the first examination he would have received compensation practically for total loss of vision in one eye, but in 6 or 8 months time that compensation had dwindled down to a fraction of that amount. Dr. Lewis thought one should be very slow in arriving at an estimate of loss of vision to be taken into consideration in adjusting the compensation that a man should get for loss of vision.

Dr. Brooks stated that this patient is an industrial case also and had wondered about additional compensation. The patient had a settlement on the basis of vision, but the hyperphoria is recent, and in this case Dr. Brooks felt that the man was not getting all he should get.

Dr. Lewis stated that if Dr. Brooks would report the hyperphoria to the Industrial Commission, he thought it would be taken into consideration even now. He had had two or three cases where additional compensation had been allowed on account of hyperphoria.

Dr. Brooks stated that Dr. Burch had also seen this case, and Dr. Burch told him that he had had two or three cases, one of which had cleared up in 6 months and the other took a year. Dr. Brooks felt that this case would not clear up altho it might stabilize at some definite degree of hyperphoria so that a proper prism could be used for correcting diplopia.

Ocular Injury.

Dr. K. C. Wold reported the case of Mr. L. G., aged 24, who was referred to Dr. Swanson. On June 14, 1925, the right eye was struck by a stone. Examination of the patient showed edema of the lids, severe congestion of the

eyeball, and apparently a complete detachment of the iris, which was lying in two folds in the lower part of the anterior chamber. The retinal reflex was obliterated by intraocular hemorrhage. Rest in bed, hot applications and atropin gradually diminished the cyclitis and about two months following the injury fundus details were made out.

Examination now shows the upper two-thirds of the iris detached and lying across the lower part of the anterior chamber. The iris has atrophied to a very narrow ribbon like structure. the eye was aphakic, the lens lying at the bottom of the eyeball where it can be seen very distinctly. The edge of the lens is clear, and refractive displacement of retinal blood vessels can be seen thru it. The disc appears small but seems normal. Immediately nasal to it there is a choroidal tear extending in a crescentic manner slightly over and under the disc. Normal retinal vessels pass over it. The macular region has been "punched out" and is filled with pigment, which accounts for the poor vision.

Retinoscopic findings show + 10. Sph. ⊃ + 1.00 Cx. 105°. The patient has light perception and projection, and with correction found with retinoscope, can count fingers.

Leonardo da Vinci.

Dr. John A. Watson read the paper of the evening on this subject.

Dr. Walter Camp,
Recorder.

BALTIMORE MEDICAL SOCIETY.

Ophthalmological Section.

December 3, 1925.

Dr. Alan C. Woods, President.

Ophthalmologic Aspects of Papilledema.

Dr. Emory Hill read a most interesting paper which will be published in full elsewhere. After a review of the experimental and pathologic studies which have been made bearing on the etiology of choked disc and its relation to increased intracranial pressure, he presented a report of thirty-four cases and discussed the relation of the location of the intracranial lesions to the degree and incidence of choked discs. In several cases the swelling of the disc was much more marked on the same side as the tumor, but he did not regard this as a certain sign of the localization of the lesion. He called attention to the sclerotic changes in the retinal blood vessels which often occur late in the course of papilledema, but are occasionally seen in its earlier stages. The visual field defects associated with intracranial tumors were briefly discussed.

Surgical Significance of Choked Disc.

Dr. Walter Dandy in discussing this subject stated that the more we learn about the diagnosis and treatment of brain tumors, the more capricious and uncertain does the incidence of choked seem. He had come to regard choked disc as pathognomonic of nothing, and to feel that the finding of choked disc was merely to be taken as a single link in a long chain of clinical evidence. Many cases exhibit conspicuous signs of increased intracranial pressure without any ophthalmoscopic changes. On the other hand, Dr. Dandy believed that a considerable number of cases, which on ophthalmoscopic examination show outspoken choked disc, are not due to brain tumor. He has seen a considerable number of such cases in which the possibility of brain tumor has been excluded by ventriculography. Of these cases some go on to complete cure without any operative interference, others, he believed, were caused by disease of the nasal sinuses.

Dr. Dandy stated that the degree of choking of the optic disc could not be clearly correlated with the location of the intracranial tumor, nor in unilateral choked disc was the fundus lesion necessarily on the same side as the intracranial one. Retinal hemorrhages, he felt, generally depend on the rapidity with which the papilledema has developed and are an indication for prompt surgical interference.

Medical Significance of Choked Disc.

Dr. Arthur L. Bloomfield said that he had been much surprised to find in reviewing the literature how many diseases have been mentioned as the

causes of this condition. Not only the commoner causes with which we are all familiar are mentioned in the text books, but a wide variety of intoxications and acute infections are alleged to cause papilledema. His own experience was not in accord with this, and he felt that papilledema in conditions other than those which he was to mention, was seen only with great rarity and in very slight degree. It seemed to him useful to differentiate betwen mild grades of papilledema with slight blurring of the margins of the optic disc on the one hand, and outspoken protrusion of the optic disc on the other. Of this latter group, practically all, in his experience, was caused by brain tumors. In syphilis choked disc was an extremely rare manifestation. Mild grades of choking are sometimes seen in luetic meningitis. High degrees of choked disc in lues were almost always due to gummata of the brain. In the late stages of meningitis high grades of choked disc may appear, but during the acute stage fundus changes are rare and then only in slight degree. He had seen no case of conspicuous choked disc in epidemic encephalitis.

Discussing next the question of retinal changes in nephritis and their relation to increased intracranial pressure, he felt that it was as a rule very easy to differentiate the retinal edema of this condition from ordinary choked disc. Acute nephritis very rarely causes any retinal changes. Concerning chronic hypertensive nephritis, he felt that it was impossible to say whether this was essentially a renal or vascular disease. These cases generally go thru a period of hypertension lasting for some time before any renal insufficiency can be discovered, and during this early period vascular changes in the retina are conspicuous. In the later stages of the disease, swelling of the optic disc is added to the ophthalmoscopic picture, and this, he felt was probably due to increased intracranial pressure, for these cases exhibit a marked increase in the spinal fluid pressure and often suffer from very severe headaches, which differ from the headaches ordinarily seen in nephritis and hypertension and which are at least temporarily relieved by lumbar puncture.

Dr. Harry Friedenwald agreed with Dr. Bloomfield that it was generally very simple to differentiate between choked disc and albuminuric retinitis, but stated that he had seen several cases in which he was unable to make a differential diagnosis on the ophthalmoscopic picture alone. From his own experience he was inclined to believe that choked disc due to nasal sinus trouble was extremely rare. In the cases that he had seen the edema of the optic disc was generally very slight and the visual disturbance out of all proportion to the ophthalmoscopic picture. It is of extreme importance in differentiating neuritis from papilledema to make careful tests of the visual fields, both central and peripheral: enlargement of the blind spot and slight concentric contraction of the field is characteristic of early choked disc; central scotomata and marked loss of vision are characteristic of neuritis. He felt that neurologists and internists were prone to place more importance upon slight grades of blurring of the disc margins than were ophthalmologists, who were accustomed to see this picture frequently in perfectly healthy persons. Possibly the wider use of the binocular ophthalmoscope may help us to differentiate these normal cases from slight grades of true papilledema.

Dr. Alan Woods stated that his experience in the matter of nasal sinus disease was in accord with that of Dr. Friedenwald. He had seen six cases which had been referred to the clinic with the diagnosis of choked disc due to nasal sinus disease, but all of these have proved to be brain tumors. He had seen only a few cases of papilledema which were clearly due to nasal sinus disease and in these the elevation of the optic disc was slight and the degree of visual impairment very marked.

Dr. C. A. Clapp stated that differentiation between papillitis and papilledema was often impossible. Choked disc in syphilis, he said, was now much less frequent than in the days before vigorous antisyphilitic treatment.

DR. JONAS S. FRIEDENWALD said that changes in the retinal vessels were common in the late stages of choked disc. He did not believe that these indicated any vascular toxin, but thought they were merely an example of obliterative endarteritis, such as is seen in blood vessels of all atrophic organs.

DR. WILLIAM TARUN stated that he had seen a case of conspicuous choked disc due to nasal sinus disease.

JONAS S. FRIEDENWALD,
Secretary.

KANSAS CITY EYE, NOSE AND THROAT SOCIETY.

November 19, 1925.

DR. J. W. MAY, Presiding.

Radical Dental Surgery in the Treatment of Diseases of Dental Origin.

DR. W. H. SCHUTZ in this paper made a plea for the more thoro search of areas surrounding the cavities left where teeth had been previously extracted. He advised alveolotomy instead of extraction of septic teeth. He emphasized the possible dental infection, which is pretty generally overlooked, of the toothless dental field or area where teeth once existed but long since have been extracted. In this location often we may find a symptomless, chronic inflammation which may be a veritable manufacturing plant of virulent bacteria. A properly developed roentgenogram studied by an expert interpreter will show whether the focus contains degenerative processes or new bone or normal residual areas.

He blamed these infected areas on an incomplete eradication of the infected area at the time of extraction, and believes simple extraction of a septic tooth is bad surgery. The only dependable means is alveolotomy accomplishing the removal of infected material with chisel and curet down to healthy tissue.

Dr. Schutz cited three cases of iritis and choroiditis where infected foci were found around missing teeth, all ocular activity subsiding after a thoro surgical removal of the infected dental area.

Discussion. CHAS. W. KEELING, D.D.S., attributed these residual area infections to failure of the operator on the removal of a tooth with a definite granuloma, or one with a diffuse area of necrotic bone not well defined, to remove such area of infection by surgical procedure, or in the less extreme cases by a simple curettement. Many surgeons and dentists criticize curettage, claiming it stirs up the organisms and causes a reaction by their resorbtion. But if the curettage is thoro and the granuloma is removed intact by using a sharp curet, the reaction will not be great.

He believes the surgical removal of teeth is indicated in exostosis and excementosis, crooked roots, in cases where there is danger of breaking away the process, and in all cases where the pathologic condition is of such size and location as not to afford easy access for its complete removal.

DR. J. W. KIMBERLIN,
Reporter.

COLORADO OPHTHALMOLOGICAL SOCIETY.

November 21, 1925.

DR. C. L. LARUE, Presiding.

Penetrating Injury by Wood.

DR. W. C. and DR. W. M. BANE presented a section foreman, aged 64 years, whose left eye had been penetrated at the temporal limbus by a small piece of wood. The wound, three millimeters long, had been artificially enlarged, and six to ten minute particles of wood removed from the anterior chamber. An iridectomy had been performed, and a 1:3000 solution of cyanid of mercury had been injected subconjunctivally, and repeated twice a few weeks later. The vision was now light perception, the tension subnormal and the lens cataractous. There was no sign of infection.

Discussion. DR. C. E. WALKER thought that the sooner the lens was removed the better. He doubted whether the pericorneal irritation would clear up as long as the lens substance was partially in the anterior chamber.

DR. J. A. PATTERSON suggested that the lens remains could be conveniently

removed by the old method of introducing a keratome at the limbus, stirring up the lens, and allowing the lens substance to escape as the keratome was withdrawn.

Macular Chorioretinitis, Tuberculous?

Dr. W. C. and Dr. W. M. Bane presented a man, aged 21 years, who had been brought before the society in November, 1920, on account of a macular condition which had at first been diagnosed as neuroretinitis and which had first been noticed in October of the same year. There had at first been a hazy appearance of the macula, which within a month took the form of an oval grayish membrane with notched edges, the fovea being seen at its nasal edge. The Wassermann test was negative. The urine had shown a faint ring of albumin. In the course of the next few months only insignificant change took place in the size and shape of this macular spot. There were no pigment deposits. After a suggestion of tuberculosis by Dr. Jackson in March, 1921, increasing doses of old tuberculin were given subcutaneously, with no local or general reaction. Pigment deposits had later appeared and the diseased area had gradually increased in diameter until by November, 1921, it was about as now, and with a round depression in the center. The vision of this eye had remained at 5/60 from October, 1920, to the present time.

Discussion. Dr. W. C. Finnoff recalled the veil like appearance at the macula in 1920, apparently following an edema of the retina. Now we had the degeneration secondary to the edema and the resultant hole in the macula.

Penetrating Injury by Rock.

Dr. W. C. and Dr. W. M. Bane presented a marble quarry workman, aged 32 years, whose right eye had been injured by a piece of rock on October 19, 1925. At that time there was blood in the anterior chamber, and the lens was cloudy. X-ray examination was negative. The eye gradually became relatively comfortable. The patient had returned on November 9th on account of pain of several days duration. Lens cortex was found in the anterior chamber, and the tension was 43 mm. The eye had become comfortable after washing out the lens material.

Discussion. Dr. J. A. Patterson said that a few years ago he had a case in which no foreign substance was shown by the X-ray. The irritation continuing, he investigated under cocain, and found a good sized pebble under the brow, and outside the sclera. Dr. Sweet said that too much current had been used in taking the X-ray plate.

Dr. F. R. Spencer saw a case in which fragments of a copper cap were not shown by X-ray, and since then he has asked the X-ray man to be less vigorous in the use of the rays, and has thus succeeded in showing a number of foreign bodies which might otherwise have been missed.

Iris Hernia Beneath Conjunctival Flap.

Dr. W. C. and Dr. W. M. Bane presented a woman, aged 66 years, from whose right eye a senile cataract had been removed on October 13, 1925. Extraction of the lens thru the round pupil had been followed by peripheral iridectomy, and a good sized conjunctival flap had been made. The patient had vomited several times during the day of the operation, and the next day a marked hernia was found to extend the whole length of the section, but covered by the conjunctival flap. At the time of showing the hernia was about half the original length but protruded further.

Discussion. Dr. J. A. Patterson was in favor of not examining eyes too soon after cataract extraction.

Dr. C. E. Walker said this hernia will gradually contract down, and is not likely to do any harm.

Dr. Edward Jackson said it was generally six or eight weeks before the decided flattening down, and it might take three months for complete contraction of the hernia.

Dr. W. C. Finnoff said that a complication of this kind is one of the best arguments for a conjunctival flap, which diminishes the danger from exposure of the iris. There is an advantage in uncovering the eye at the end of forty-eight hours, because if the

aqueous is then found to be cloudy, foreign protein can be given, with a better chance of saving the eye.

Dr. Jackson suggested that another reason for looking at the eye and changing the dressing was that if the patient was kept comfortable he was less likely to make involuntary movements which would disturb the eye.

Floraform Cataract.

Dr. W. T. Brinton demonstrated with the corneal microscope the lenticular changes in a woman, aged thirty years, who had been noticing some failure of vision for twelve months. The vision of the right eye was 20/30, that of the left 20/50, but correction gave almost normal vision. With the microscope, twenty or thirty discrete opacities, mostly rounded, were to be seen in the cortex of each lens near the periphery. The center of each opacity was thin, or entirely transparent. A few of the opacities had a figure 8 appearance. The condition was probably congenital and seemed to be identical with that described by Koeppe under the name of floraform cataract.

Discussion. Dr. Edward Jackson had seen several somewhat similar cases of cataract, but this was the first of the kind which he had studied with the corneal microscope.

Dr. C. E. Walker had watched cases of this kind for twenty years and they did not seem to alter very much.

Dr. G. L. Strader had seen the patient somewhat recently and believed that there was a refractive change in the direction of myopia.

Dr. G. F. Libby thought that in dealing with such cases we should always be careful to speak rather of lenticular opacities than of incipient cataract, because of the effect on the patient.

Dr. E. R. Neeper referred to a case of incipient lens opacities which he had seen again after a number of years, and in which the opacities seemed to have diminished, probably as the result of the use of dionin.

Siderosis of Eyeball.

Dr. D. A. Strickler presented a man, aged 40, whose right eye had on September 13, 1924, been penetrated by a fragment of a cast iron bed rail which he had been hammering. No trouble had been experienced until during the past three weeks, when the eye had become irritable, watery and at times severely painful. X-ray study at the time of the injury had been indefinite as to the findings. There was a definite corneal scar of entrance, and a corresponding hole in the iris. There were yellowish spots of exudate on the surface of the iris. X-ray localization gave foreign body probably lodged in the sclera toward the back of the eyeball. The position of the foreign body changed with movement of the eyeball. On November 21st, the corneal microscope showed coating cells in the aqueous and on the posterior surface of the cornea. (The eyeball was later enucleated.)

Discussion. Dr. Edward Jackson said that in the presence of the siderosis, the eyeball is likely to need removal within the next few months, so that it is proper to make a heroic attempt to get the foreign body out.

Dr. C. E. Walker said that his experience was that in these cases the eyeball had to be removed, and getting the foreign body out did not finish the case.

Posterior Polar Cataract.

Dr. D. A. Strickler presented a man, aged 38 years, whose left eye had a posterior cataract, and whose right eye had had a more marked posterior cataract which had subsequently cleared in part, until it presented the present appearance of a heavy membrane without the cortex. The vision of the right eye was 20/200. The opacity in the left eye was increasing in size. The patient was deaf.

Discussion. Dr. C. E. Walker said that the Panas operation might be serviceable in this case, using Panas' special forceps to pull out the anterior and posterior capsule by twisting and rupturing the zonule.

Dr. C. L. LaRue thought that if any case were suitable for needling this one was after the partial absorption of the lens.

Paralysis or Absence of External Recti.

Dr. W. C. Finnoff presented a girl, aged five years, who had come on ac-

count of convergent squint. The right eye fixed, and motion of this eye was normal in all directions except outward, where there was slight limitation. There was a similar limitation as regards the left eye, but this eye did not pass the median line. The refractive error was unimportant.

Discussion. Dr. Edward Jackson got the impression that there was some little retraction of the eyeball on turning in, and also a narrowing of the palpebral fissure. He thought this was one of the cases of congenital paralysis of the external rectus. A paper by Dr. Harold Gifford which appeared in the January number of the American Journal of Ophthalmology indicates that there is no considerable proportion of instrumental labors or of recorded damage at birth in these cases, but the author rather favors the theory of birth injury.

Dr. C. E. Walker thought that the amblyoscope should be tried in these cases.

Dr. F. R. Spencer referred to the method advised by Dr. Jackson some years ago, of using part of the superior and part of the inferior rectus to take the place of the externus.

Dr. W. H. Crisp suggested that the left eye might be operated upon by this method first, and then later it might be necessary to do a similar operation on the right eye. But a good many of these patients are well adapted to their condition, and get along fairly satisfactorily without operation.

Lymphangiectasis Simulating Xerosis.

Dr. W. C. Finnoff presented a girl of eight years who had come to the clinic on account of a chalazion. Examination had further disclosed a white area between the outer canthus and the limbus of each eye, with a greasy appearance. The mother stated that this had been present since early childhood. The slitlamp and corneal microscope showed the white area to be made up of innumerable minute lymph spaces. The correct diagnosis, which had at first seemed to be xerosis, was thus established as lymphangiectasis of the conjunctiva.

Anisocoria Relieved by Glasses.

Dr. G. F. Libby reported the case of a child of fourteen years whose unequal pupils had become of equal size after wearing a correction of ametropia of both eyes with amblyopia in one eye. In 1919, at the age of eight years, the lenses required were R. + 3.00 sph. ⌒ + 1.00 cyl. ax. 90°. L. + 1.50 sph. ⌒ +0.50 cyl. ax. 90°. By 1923 the refraction was R. + 7.00 sph. ⌒ + 1.00 cyl. ax. 90°, L. + 2.50 sph. ⌒ + 0.62 cyl. ax. 90°. The corrected vision of the right eye dropped from 5/15 partly to 5/30 partly in this time, while that of the left increased from 5/3 partly to 5/3 mostly. When first seen the right pupil was 5 mm. in daylight, the left 1.5 mm. and with the back to the window, the right was 6 mm. and the left 2.5 mm. Each pupil had a diameter of 7 mm. under cycloplegia. Dr. Libby had noticed several times that pupils which showed anisocoria without cycloplegia became equal under cycloplegia. In June, 1921, the pupils of the child, whose case was now reported, had become of equal size, after a few months of alternating equality and inequality during the previous winter; and the uniformity of size and reaction had since persisted.

Blindness After Ligation of Common Carotid.

Dr. W. C. Finnoff reported the case of a woman who had become blind in one eye after ligation of the common carotid artery on the same side, on account of carcinoma in the glands of the neck. The blind eye had only a moderate myopia, and had been the patient's good eye, while the other eye was highly myopic, with degenerative changes in the macula. The blindness was apparently due to thrombosis of the retinal artery following the ligation.

Microphthalmus.

Dr. F. R. Spencer reported a case of microphthalmus of the left eye in a boy aged six years. The vision of the other eye was apparently normal, but the microphthalmic eye did not even have light perception. The pupil did not react either to light or accommodation. The good eye had several small

opacities in the lens, and a few dust like opacities in the vitreous, while in the defective eye the lens opacities were so marked that it was impossible to make out any details behind the crystalline lens. The child had suffered from malnutrition from the age of two years, and was underweight. There was probably disease of the left ethmoids and left maxillary sinuses. It seemed probable that while the microphthalmus was congenital, the cataracts were acquired as the result of malnutrition.

WM. H. CRISP,
Secretary.

MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA.

Section on Ophthalmology and Oto-Laryngology.

January 15, 1926.

DR. W. T. DAVIS, Chairman.

Ulcerative Keratitis in Small-pox.

DR. BILLARD presented the following case. On June 15th, Mrs. S., aged 45, who had been ill with small-pox for five days, was seen for an eye condition at the District small-pox hospital. She was delirious, with a temperature running between 103.5° and 104.5° F. There was an extensive maculopustular eruption over her whole body, but more particularly over the arms, chest, back and face. Her face was very much swollen, and her eyelids were swollen and red.

Upon examining her eyes a most unusual condition was noted. Dense bands of mucus extended from the lower culdesac to the upper lid, entirely concealing the cornea. These could not be removed with warm boric irrigations but had to be removed with cotton applicators passed under the upper lids. The corneae could then be seen clearly and were entirely normal. The patient was seen again two days later and the bands had reformed, altho she had been treated at regular intervals with boric irrigations, argyrol and liquid petrolatum.

After four or five days her general condition had improved and there was found to be some limitation of motion in each eye on looking down. Upon further examination the upper palpebral conjunctiva was found adherent to the globe and purulent fluid had collected in the upper fornices. At this time each cornea showed evidence of ulceration near the margin.

The treatment was continued as stated above, except that the argyrol was replaced by mercurochrome 1 per cent and atropin instilled daily. After four weeks stay in the hospital the patient was discharged as cured of small-pox. At the end of the sixth week the tenacious discharge continued and both corneae showed superficial ulceration at several places, more marked near the limbus in each eye. She was then taken to the Episcopal Eye, Ear and Throat Hospital, where she remained about six weeks. While there she developed an indolent central ulcer of the right cornea, and the marginal ulcers showed little tendency to heal. Her general condition was good; blood Wassermann negative, and all foci of infection eliminated. At the time of her discharge neither cornea stained with fluorescein, but were opaque as a result of a deep seated exudate which showed little tendency to absorb, and there was a marked vascularization of the corneae. Vision: Hand movements in each eye.

One month after discharge the right cornea showed a small area to the nasal side which was quite clear, and some clear cornea around the periphery; left cornea showed a clear area to the temporal side. The tarsal surface of each upper lid showed scar formation.

Discussion. DR. W. T. DAVIS said this very interesting case complicating small-pox impresses one as being possibly an atypical form of keratomalacia due to profound nutritional disturbance, and recalled having seen similar cases during a widespread small-pox epidemic in the Philippine Islands. Dr. Billard's patient seemed to have suffered from membranous conjunctivitis which so cut off the nutrition of the cornea that this condition resulted. He suggested that subconjunctival injections of salt with massage might be of value in such a desperate case.

DR. J. B. GRIFFITH said that the extreme vascularity of the cornea should be a very favorable indication in this case. He mentioned a case of recurrent ulcers of the cornea of obscure origin, in which there was found a low grade infection of the prostate. The ulcers cleared up permanently after the prostatic condition was cured.

DR. CUMMINGS said that there were two other cases of small-pox during the epidemic of 1924-25, complicated by ulcer of the cornea. Neither of these cases proved to be severe and recovered with little loss of visual acuity.

DR. BILLARD (closing) said the chief points of interest in this case have been the extremely slow course it has run, the dense infiltration of the cornea when the depth of the ulceration had not seemed to justify it, and the fact that all precautions were taken to avoid just such a result.

JAMES N. GREEAR, JR., M.D.,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

OCTOBER 19, 1925.

CHARLES P. SMALL, M.D., PRESIDENT.

The Fusion Faculty and Some of Its Anomalies.

DR. WALTER B. LANCASTER, Boston, Mass., read a paper on this subject. (See page 247.)

Discussion. DR. FRANCIS LANE said: No one has yet definitely proved the exact location of the fusion center or possibly centers; but, because its definite location might clear up some of the problems before us more easily, the fixed idea seems to have arisen that it must exist.

A century ago physiologists maintained that all regions of the cerebrum functionated equally, but certain discoveries gradually proved that definite cortical areas possess specialized functions. This knowledge was brought about largely thru physiologic and pathologic researches supported by the histologic findings. Accepting that certain zones do regulate unmistakable duties justifies us in the belief that a fusion center is an entity and that in all probability it is greatly influenced by the visual receptive and association centers, and furthermore that it is submitted to a gradual and varied development controlled to a certain extent by the unfolding, in the beginning, of definitely fixed higher and lower centers.

Putting aside for the moment our opinions, let us briefly consider some of the centers and paths of which we are familiar, and which certainly have a direct relationship to fusion sense.

The sensory apparatus of the eye is best regarded as a prolongation of the brain, consisting of a system of afferent and efferent connections, thus forming a sensori-motor reflex arc. Nervous stimuli result from converting rays of light, by which images in space are thrown upon the retina, into nervous excitations. Just how this takes place we do not know, but we assume that thru physical and chemical changes the phenomenon occurs in the rods and cones. Impulses created in the retina are conveyed by the optic nerve partly to the nucleus of the third nerve, and in part to the cortex of the occipital lobe. Direct and consensual reaction of the pupil, accommodation and convergence result from impulses which reach the oculomotor nucleus, while visual impressions arise from those impulses going to the occipital cortex. Following a semidecussation of the fibers in the chiasm, terminations occur in neurones in the primary centers at the base, namely the pulvinar of the optic thalamus, anterior corpus gradrigeminum, and the lateral geniculate body. From these basal centers the visual fibers form Gratiolet's optic radiation and terminate in the ganglionic cells of the occipital lobe where either visual impressions are formed or a reflex motor impulse is transmitted to the nuclei of the 3rd, 4th and 6th nerves.

Visual fields of soldiers suffering occipital lobe lesions during the world war indicate that the cortical center for optic impressions conveyed by the macular bundles is represented by a narrow strip situated in the posterior part of the calcarine fissure, the adjacent portion of the cuneus, and the

lingual gyrus. The visual cortex presents structural peculiarities, principally that it amounts to not more than one-half the thickness of the motor cortex.

Before fusion of the two images becomes possible it is absolutely necessary that binocular fixation be first established. The entire mechanism of muscles and nerves with which the two eyes are supplied is intended to bring about this very complicated process thru coordinated movements, and fortunately the vast majority of cases possess this faculty, but should any derangement occur a deviation from the line of fixation would result.

The nerve centers presiding over ocular movements are connected with supranuclear centers which effect coordinate movements, hence are termed association centers. These centers are intimately related to fusion, and should be briefly considered.

The nuclei of the 3rd, 4th and 6th nerves lie on the floor of the fourth ventricle beneath the aqueduct of Silvius. The nucleus of the 3rd is composed of a number of partial nuclei lying in the region of the anterior corpora quadrigemina beneath the aqueduct, but just which group of ganglion cells belongs to each muscle supplied has not been absolutely determined in man. The fibers pass downward thru the crus and become visible at the base on the anterior border of the pons. The nucleus of the 4th which lies immediately behind that of the 3rd and on a level with the inferior colliculus of the quadrigeminum, sends its fibers dorsally. These decussate in the anterior medullary velum, coming out at the base and winding about the crus. The nucleus of the 6th lies some distance behind the other two along with the genu of the 7th. Its fibers pass downward between the bundles of the pyramidal tract and appear at the lower posterior border of the pons. The three nerves then pass forward in the wall of the cavernous sinus and those of the same side. The three nuclei are also connected either directly or indirectly with centers in the cortex and with the anterior corpora quadrigemina. The exact location of these cortical centers is not definitely known, altho it seems likely that the middle frontal convolution presides over conjugate eye movements which are either voluntary or involuntary. The voluntary movements probably originate in the frontal cortex and connect with the association centers and motor nuclei of the opposite side. The involuntary movements are purely reflex in response to visual impressions and comprise those movements by which the eyes are adjusted to secure fusion. Complete binocular fixation and fusion develop in infancy, starting with incoordination and finally resulting in subconscious or habitual fusion movements. All these centers referred to are indirectly connected with an extremely complicated mechanism, forming an unbroken chain, the most important link of which thus far is undetermined.

"A chain is as strong as its weakest link", similarly the grade of binocular vision seems to be dependent on a closely related system of centers, a weakness in any one of which can produce an anomaly of this very important sense.

Dr. Edward Blaauw, said that in speaking of the fixation center, binocular single vision and not simple binocular vision was referred to. This latter meant double monocular, which might be alternating vision, but did not necessarily mean bodily or perspective vision. The trend of the papers was strongly anthropomorphic, which was delusive and should be ruled out in a scientific discussion. Nothing was known about what might happen in the brain and in the sensory apparatus of lower animals. The fixation center was the highest center that developed in the human race, and had, therefore, a rather labile equilibrium. The question of anopsia from nonuse had been talked about so often that a discussion of it became tedious. Didactic expressions did not solve this very difficult question. The fusion center did not develop in all individuals in the same sense. He believed the fixation center to be at the base of the whole problem. The subject had been threshed out for fifty or sixty years among ophthal-

mologists, who were still in two camps, neither of which could convince the other.

DR. LANCASTER (closing) said that Dr. Lane and Dr. Blaauw had brought up several interesting points about fixation centers. The prevalent conception seemed to be that there was a single spot in the brain that did one thing, and another spot that did another thing; one being called the center for this, and the other the center for that; each center doing one thing and one only. His conception of the mechanism of the brain, however, was quite different. It might be compared to the mechanism of a football team, wherein the captain had under him ten men or so, carefully instructed; when the quarterback called a signal, these men combined in a certain formation; another signal, and the same men executed another formation. It was the same with the eye; at a certain signal, the eye looked up; another signal, and the eye looked in a different direction; the head might move, perhaps the body, as well as the eyeball. One might say that the signal occurred in some spot which was the center. That, however, was not so. The signal for moving the eye was seeing something —a sensation, or hearing something and looking to see what was heard, or thinking of something and directing the gaze toward it. The signal came in over the sensory paths to the brain, and the coordinating conducting wires were set in motion to effect a play, of which that was the signal. It was not necessary to conceive that everything had a special spot where it took place. Sensations were coming in all the time from all parts of the body, requiring special motor impulses—not requiring a special spot or center. Fusion was different. By one eye a sensation from one point of view was received; by the other eye a sensation of the same object from another slightly different point of view. These two sensations produced by the same object were slightly different because from a different angle. They were blended by the brain into a single sensation, different from either in that it possessed three dimensions—not only length and breadth, but depth or relief. This was done by psychical fusion, not by some physical process, but as Dr. Blaauw said, by the highest function of the brain. That is getting into the realms of psychology.

Contributing Factors in Failure to Correct Convergent Concomitant Squint.

DR. LUTHER C. PETER, Philadelphia, Pa., read a paper on this subject. (p. 253.)

Discussion. DR. HARRY WOODRUFF said that he would leave the first part of Dr. Peter's paper, dealing with the cultivation of the fusion faculty, for others. He would like Dr. Albro's views on the subject, as he was an extremist in that respect, and believed that the fusion faculty could be cultivated in some patients up to fourteen years of age. This required wonderful patience; few had sufficient patience to secure the results that could only be obtained by very painstaking work. Regarding the failures in operation, it made considerable difference whether the operator was experienced or inexperienced; and when one considered that there were more than fifty kinds of operations for correcting strabismus, it was certainly hard for the beginner to decide the method of choice. He had followed the method of Worth for a number of years. Any one familar with the operation of advancement would understand the necessity of securing some anchorage in the socalled episcleral tissue, which Dr. Peter correctly referred to as being thicker anterior to the muscle insertion; but it was also a tissue which was pretty hard to differentiate. When one realized that the thickness of the scleral tissue is about .6 of one mm., and the thickness of the smallest needle nearly one millimeter, it would seem rather a difficult matter, especially for one not very familiar with the operation, to secure some anchorage in either scleral or episcleral tissue. The operator would realize the danger of perforating this thin sclera, and probably err on the safe side and not secure sufficient anchorage. For this reason most operators advised securing an overeffect, the idea being that

the sutures would slip or give more or less.

Some fifteen years ago, he had begun to use the method of shortening by the tucking operation, first following the method of Todd of Minneapolis, later abandoning the tucker and making a fold in the tendon with a suture, and later using a tucker of his own design. The operation certainly had some very obvious advantages over the method of advancement, one important one being the fact that the needle was not placed in the sclera or episcleral tissue, and there was no danger of perforating the sclera. As to the effect obtained by this operation, it was admittedly not in itself a 100 per cent operation. In his opinion, it was almost invariably necessary to perform a tenotomy in connection with the tucking operation. The early operators confined their methods to tenotomy alone. They had such disastrous results that the advancement operation was advocated by Landolt, who used this in preference to tenotomizing the internal rectus. Most operators nowadays used either tucking or advancement and tenotomized more or less as needed—a wise practice. If an attempt was made to secure a satisfactory result by either tucking or advancement alone, a tremendous strain was put on the sutures. Frequently an enophthalmos was produced. Therefore, it was a good plan to relieve that strain by tenotomy of the opposite muscle. If this general method was followed, the largest percentage of good results would be secured. That is, in convergent strabismus, the operator should do all he could by the tucking operation, either with or without a tucker—of course noting the effect as he goes along (the patient should be under local anesthesia) then tenotomize the internal rectus muscle more or less. In this operation of tenotomy, when carefully cutting the fibers of the tendon, it was frequently noted that there was apparently very little change until the last strand was cut, and then over went the eye. In that event that tendon should be brought back with the suture, so there was absolute certainty that an overeffect was not produced. One cause of failure was an overeffect produced at the time of operation, some operators laboring under the idea that there should be an overeffect, which was not true in a tucking operation, because the patient would continue to have an overeffect in nearly every case, causing a permanent divergence. The effort should be not to get an overeffect, but if it had occurred, bring the tendon back where it belonged, leaving the patient with a small amount of convergence, which was safe so far as the future was concerned.

Dr. Peter had not mentioned anesthesia. Many operators preferred general anesthesia. This in his opinion was not satisfactory. It left too much to the imagination and the result could not be ascertained until after the patient had recovered from the effect of the anesthesia. Nowadays, with all the improvements in local anesthesia, with novocain injected deeply into the orbit, back into the belly of the muscle, it was possible to secure almost perfect anesthesia, so that the tendon could be handled and folded without causing suffering to the patient. When one was hurting a patient, the operator was as anxious to finish as the patient was, and was, therefore, likely to stop before he should.

One more point about advancement. It brought the insertion nearer the cornea, giving greater power on the eyeball, increasing the effect. Was the effect of advancement greater than the effect of tucking? That might be true, but it was probably not in exactly that way. The permanent insertion of that advanced tendon was at the point of the original insertion of the tendon, because the tendon must grow fast on that point of the globe where it was cut, and the power of leverage was not increased, but the muscle only shortened.

Dr. Merlin Z. Albro said he was not quite so extreme as Dr. Woodruff seemed to think. He had never had any thought that fusion could be developed late in life, but it was well known that in the case of an injured eye.

its amblyopic mate would naturally develop vision to a high degree. That is, its macular development might nearly equal normal vision. That being so, it would seem reasonable to suppose that it might be possible to develop macular vision in a case in which the good eye still functioned. But in his experience, it had been impossible to induce any individual over fourteen years of age to spend the necessary time to accomplish that result. Such a thing would require from two to five years and very few people were willing to give that much time out of their lives to develop another eye of which they knew nothing. He agreed with Dr. Peter absolutely from beginning to end. The principles of fusion training derived from Worth's work had been used by him for many years. The greatest difficulty was not in the management of the case of a child, but in the management of the parents; if the child was good and capable of being handled, one was practically assured success, otherwise, failure was equally assured.

Dr. Robert Von Der Heydt called attention to Worth's theory that the factors that produced a squint were muscular imbalance plus inequality in the visual acuity due to an amblyopia or a high refractive error in one eye. Exceptions were the cases where high degrees of hypermetropia caused imbalance between the accommodation and convergence. These were most grateful patients if given glasses soon enough. The most baffling type was an alternating squint where there was an equal value of both maculae. Here binocular fusion could not be acquired, because when one eye fixed, as a rule, the image of the other fell on the blind spot. Consequently the squint was perpetual and fusion impossible. In these cases operation must be done as soon as good visual acuity was found in each eye, irrespective of age.

Dr. John Monro Banister commended Dr. Peter's paper as being upon a most practical subject in ophthalmic surgery. However, after many years of experience in operating upon the type of cases discussed, he felt he must take exception to some of the statements made. First: the essayist decried the performance of tenotomy in cases of strabismus and strongly advocated the technical advancement of the antagonist as the corrective measure, especially in internal strabismus. Second: he considered a muscle shortening operation of little or no value. Third: he condemned catgut as suture material for the buried suture in muscle shortening operations. Fourth: he considered the resulting "hump" as furnishing a most practical objection to the muscle shortening operation, evidently assuming that the "hump" would be permanent. Taking these points in regular order, he desired to point out that in cases of strabismus, especially of the internal variety, which the essayist stressed, a tenotomy of the overacting muscle was a most valuable measure of treatment when properly used, where the degree of deviation required it. Such tenotomy, however, should consist only in a complete separation of the tendon from the sclera without any attempt to secure an increased effect by interference with its attachments to Tenon's capsule. The chopping of Tenon's capsule must be avoided. If a greater effect was desired, such should be secured thru a shortening operation performed on the antagonist. Should the effect of the tenotomy be too great, a control suture should be used drawing the end of the severed tendon nearer to its former attachment, and fixing it there. Such control suture was of value in any case of tenotomy, as preventing any further retraction of the divided tendon.

He had been using the muscle shortening operation for the last twenty-seven years, with most satisfactory results. He never used the technical advancement. In combination with tenotomy of the overacting muscle, in his hand it had been all that could be desired in permanence and in securing the proper effect. That afternoon he had operated at the County Hospital upon a case showing a marked degree of internal strabismus by a tenotomy of the internus and a tuck shortening of the externus. The result at the

table was perfect. He invariably used a buried catgut suture in taking the tuck, with ideal results. It caused no trouble, and as for the "hump," it soon disappeared and furnished no argument against the method. The disadvantages of the technical advancement were that it was not devoid of danger, owing to possible perforation of the sclera in the neighborhood of the "dangerous zone," and that its effect could not be accurately regulated as in the tenotomy combined with the muscle shortening method. Once in place, it must remain or be removed and reintroduced to secure a greater or lesser effect. Then again, without the tenotomy of the antagonistic overacting muscle in high degrees of deviation, it was likely to fail in securing the desired result when limited to the affected eye.

These remarks were advanced as a protest against the condemnation of tenotomies in strabismus operations, which surgical measures, when properly performed, were invaluable. A deviation of less than 15° of arc was not adapted to a tenotomy as the least effect to be expected in such would amount to this number of degrees. Here advancement or shortening of the antagonist would be in order.

Dr. Michael Goldenburg was pleased to hear Dr. Peter's statement, that in advancing a rectus muscle as in the Worth operation, the arc was definitely increased. He himself had been using this procedure for about fifteen years, with that idea in mind as the attractive feature, but recently had changed to the Reiss operation for no better reason than that argument to the contrary had been persuasive.

An observation common to most surgeons was probably a factor in making this change; that is, that an operator of reasonable experience and skill attained the required result, whatever the procedure. This he concluded was not due so much to the operation used as to the state of the muscle or muscles to be operated on. Frequently he had observed that an external rectus that was to be advanced was an abnormal muscle. It might be well developed, but it was flabby and lacked tonicity as if the nerve supply were deficient, or because it was so poorly developed, or its anterior point of attachment was so far back. The opposing muscle in these cases, especially the internal rectus, was usually very powerful. In such cases he usually tried to do a partial tenotomy of the opposing muscle, but as Dr. Woodruff stated, the desired effect was apparently not obtained until the last fiber was cut. When compelled to do a complete tenotomy, he tried to limit it to the muscle and to avoid severing the attachments to Tenon's capsule. A widely severed external or internal rectus muscle would retract and might become attached to the posterior pole of the eye in the region of the optic nerve, and this was to be avoided if possible.

At the Illinois Eye and Ear Infirmary, the different surgeons used different operations, but over a period of time the ultimate results seemed equally good. One recognized operation appeared as good as another, and he was inclined to the belief that failures were not so much the result of the operation used as the character or development of the muscle to be operated on.

Dr. Luther Peter (closing) said that he doubted whether he could answer satisfactorily all the points brought out in the discussion, but that he would do his best. He was almost entirely in accord with Dr. Woodruff. The tuck was probably the most satisfactory operation for inexperienced operators to use, in spite of Dr. Banister's contention to the contrary. However, he thought Dr. Banister would find, upon perusal of his paper, that he was nearly in accord with him, tho not so radical. Undoubtedly the tuck would give the younger man less trouble than advancement. Perforation of the sclera was exceedingly rare even in the hands of the inexperienced. As Dr. Woodruff had said, they were more apt to go the opposite extreme and not introduce the needle far enough, thus permitting the suture to slip. If the eyes were closed for five to seven days, there would be surprisingly little strain on the suture—if the suture material were good, which was not always true in Philadelphia.

The tucking operation had been found satisfactory in his hands in selected cases, and he was satisfied that catgut was not the suture material of choice in a tuck.

Regarding the tenotomy, he could not quite agree with Dr. Woodruff's statements. After resection, the tendon should be attached to the sclera and the suture brought out thru the conjunctiva with a loose fold, not tied; the tenotomy was then under perfect control for the first five days, the suture could be drawn up or released, as desired, but there was no danger of it slipping back or creating a paralytic squint. A complete tenotomy should never be done without controlling the tendon.

As Dr. Albro had said, amblyopia could be improved to a remarkable extent even when the child was seven years old, and he had obtained results in children of twelve and fourteen. Children were very sensitive about the attention their eyes attracted and when the matter was put before both the parent and child, the cooperation of both was generally obtained, but without the parent's cooperation satisfactory results were seldom to be hoped for. The alternating type of squint should be operated on early and in those types where there was apparently no visual acuity, vision which was latent but present could sometimes be developed.

He had not intended to imply that the tuck was worthless. His paper distinctly said it had a limitation—on which he stood. It could not be more valuable than a resection, because the muscle was not brought forward but the stump stood and the muscle was attached to the old stump in exactly the same position. Dr. Banister said he could go back and tuck and retuck if he did not get the right position at first. After a number of advancements had been done under local anesthesia, a pretty accurate estimate could be made as to the amount of tissue to be resected. The condition of the muscle helped determine that, and as Dr. Goldenburg had said, when the muscle was picked up a very fair idea could be obtained as to how much to take out. This could only be learned by experience,

The tuck was better for the moderate degree of squint. The danger of advancement was very slight. There was no excuse for perforation of the sclera and if Worth's technic were followed there was not much danger of this happening. If the suture was placed first there was no danger of placing it too high or too low.

Dr. Banister had spoken of the danger zone. There was danger of getting an inclusion cyst if the tissue was penetrated too deeply. Silk was the proper suture to use with or without the tucker.

CLARENCE LOEB,
Recording Secretary.

AMERICAN BOARD FOR OPHTHALMIC EXAMINATIONS

The American Board for Ophthalmic Examinations will hold examinations at Dallas, Texas, April 19-23 and at San Francisco, California, April 26-28.

The following Candidates were certificated at the Chicago Meeting, October 19, 1925:

Sigmund A. Agatston, New York City.
Harold Bailey, Springfield, Mo.
Milton L. Berliner, New York City.
Ray Karchmer Daily, Houston, Texas.
John Frederick Gipner, Rochester, Minn.
Ferdinand H. Haessler, Milwaukee, Wis.
Louis George Hoffman, Chicago, Ill.
Edmund Lloyd Jones, Wheeling, W. Va.
Donald J. Lyle, Cincinnati, Ohio.
George Alford Maghy, Los Angeles, Calif.
James Virgil May, Marinette, Wis.
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GRAPHIC RECORDS OF OPTIC DISC.

In recording conditions of the ocular fundus a sketch of a few lines is often more descriptive than many words. Record blanks have been printed with outline maps printed on them; in which a circle or oval represented the optic disc, with lines to represent the retinal vessels passing off from this. Rubber stamps have also been made by which such outlines could be stamped in a case book or on a record card. Upon these outlines it is easy to sketch the appearances of which a record is desired.

In the *British Journal of Ophthalmology*, for February, 1923, (v. 7, p. 81.), Pickard described his method of recording, for future comparison, the size and character of the cup observed in the optic nerve entrance; to determine what changes occur in it, particularly its development in glaucoma. Briefly, his method is to draw a circle or oval representing the outline of the disc. Within this is placed a second figure, representing the outline of the mouth of the cup at the surface of the disc; and inside it a third figure to show the bottom of the cup. Between these outlines of the cup are drawn radiating lines for the slope of the sides of the cup; which are omitted where the side of the cup presents, not a slope but a "step." When the surface of the disc protrudes in advance of the retina, this is indicated by curved lines. These signs are shown in Fig. 1.

Instead of such a map the writer has for years drawn an approximate cross section of the disc; showing its protrusion, or cupping. This has usually represented a cross section in the horizontal meridian. Such a drawing shows the width of the cup, its location with reference to the center of the disc, its depth, the steepness of the sides, or whether they overhang. Specimens of such drawings are shown in Fig. 2.

If the card or page on which the record is kept is ruled, one of the horizontal lines may be taken as representing the general level of the disc; and the excavation or protrusion is represented with reference to this line. In making this kind of record one does not simply reproduce with pencil the outlines he sees thru the ophthalmoscope, as he would by Pickard's method. Measurements must be taken of the depths of the various parts to be represented. Such measurements are taken in diopters, of hyperopia or myopia. Starting from emmetropia

each diopter of H. represents a little less than one-third of a millimeter of protrusion, while each diopter of M. represents one-third mm. of depth.

Such records may be useful in tracing the development of glaucoma cups; as Pickard points out and illustrates by seven of his cases, observed after intervals varying from 3 months to 7 years. More frequently they are valuable in following the course of a swelling of the nervehead in optic neuritis or papilledema. In these cases the outlines that would be used for a map, like those of Pickard, are much less definite. But the swelling, measured in diopters, can be drawn to scale and the extension of swelling beyond the edge of the nervehead is indicated by the outline of the profile of the prominence beyond the line drawn to indicate the limit of the optic nerve.

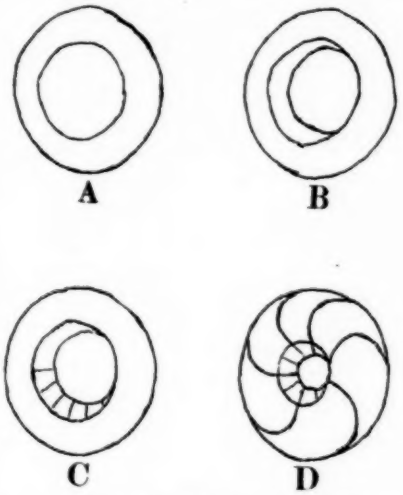

Fig. 1. Record of optic disc (Pickard) A, outline of disc and of cup. B, outline of bottom of cup added. C, radiating lines showing slope below omitted for shelf above. D, protruding disc with small cup in center.

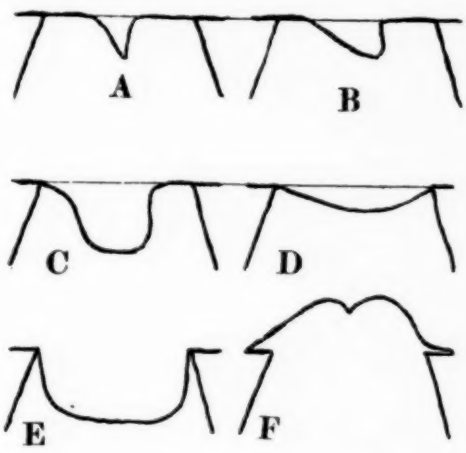

Fig. 2. Sketches recording section of nerve head perpendicular to plane of disc. Fine straight line shows level of fundus. A. and B, normal discs with conical cups. C, cup having abrupt nasal side. D, cupping in optic atrophy. E. glaucoma cup extending to edges of disc. F, swelling of disc in optic neuritis or papilledema.

Where it is worth while such representations of sections, vertical or taken at any oblique angle, may be sketched with an indication of the meridian they represent by degrees, or the figures of the clock dial. Sketching conditions seen with the ophthalmoscope is always good practice; and when one has become familiar with such graphic records by making and using them, they can be interpreted at a glance; and convey a more definite impression of the condition recorded, than can a detailed elaborate written record.

E, J.

GRADUATE STUDY IN OPHTHALMOLOGY.

Among the News Items this month, will be found the announcement that the combined postgraduate course in ophthalmology, opening to those who take it all the educational opportunities of Vienna, will be given this year for the third time. Vienna became famous 60 years ago thru its special courses in ophthalmology, given by individual teachers. But to get the benefit of any such course, the student had to wait until a sufficient number had applied to take the course; or make his own special arrangement with the teacher and pay the larger fee for individual instruction. Even then it was rarely possible to fill in the day, or get two or more of the courses on different desired subjects at one time.

But those who go to Vienna, October 1st, and stay until December 4th this year, will have every day filled with the most desirable teaching. Rarely, if ever again, will the opportunity be presented to hear, in the

English language, Professors E. Fuchs, Dimmer, Meller, and Lindner and Docents A. Fuchs and Bachstez, with their able colleagues and assistants, join in such a presentation of ophthalmology and the other branches of medicine in their direct relations to it; and all this with the greatest economy of the student's time. We will be surprised if, among the readers of this journal, there are not enough who apply for this course to completely fill the class. We know something of the interest and enthusiasm awakened in those who took the first course of this kind in 1923; and have no doubt that the course this year will be more thoroly organized, more complete and better carried out than that which was given by most of the same teachers three years before.

When Prof. Fuchs was in America in 1921 and 1922, and gave his two weeks courses of lectures in many different medical centers, he opened to American ophthalmologists an opportunity for graduate teaching of which others have been quick to avail themselves. Lindner, Koeppe, and Graves are shining examples, of workers who have brought the best of European achievement in modern Ophthalmology to American students. But Prof. Fuchs did something more; he demonstrated to American Ophthalmologists that they had a latent appetite for learning. That in spite of being widely scattered over a continent, they could get together for two weeks at a time, for honest intensive graduate study; that they would feel the better for it, thruout the year; could give their patients better service, and be themselves once more in the direct line of professional development. Furthermore, that this was all possible apart from any great teaching institution and even without the assistance of a world renowned teacher like Prof. Fuchs.

Prof. Fuchs' class at Houston, Texas, resolved to meet again the next year for such a period of study. When the time came, and its plans seemed impractical to some in charge, the Colorado Societies, both Ophthalmologic and Oto-Laryngologic, stepped in, and held such a course in July 1923. That year they gathered in Denver, a class of over 40. In 1924, the class was about 50; last year it was over 60.

A part of the Denver teaching has been thru demonstrations and clinics, given to sections of the class. This can be done best to sections of not over six students each. In a two weeks' course, it is practical to give ten such demonstrations, each teacher repeating his demonstration each day to a new section. This limits the number, who can take the course each year, to 60. However, this year the course, which will be given at Denver, July 10 to 22, while limiting the number of those who can take the full course to 60, will provide lectures, lantern slide and balopticon demonstrations, and round table discussions, that will fill three-fourths of the time for more than double the number.

The section for graduate teaching, first arranged by the Committee of the American Academy of Ophthalmology and Oto-Laryngology in 1921 and carried out at the Philadelphia meeting, has since been a very important part of the work of the Academy in its crowded annual week of meeting, examining and planning and developing of professional enthusiasm. Already, its plans for the Colorado Springs meeting in September are well developed, and show its continued willingness to try new ideas, teachers and methods, that may promise usefulness in the important field of graduate study.

There will come a time when continuous professional development by graduate study will be regarded as just as important, and will be just as much expected of any member of the medical profession engaged in active practice, as a regular course in a properly equipped medical school is now expected before entering upon practice. Professional development is the work of a lifetime. It is never attained by one who believes it is only a matter of four or five years at school; and the assuming of a knowing air and good professional manners. In this particular advance of the medical profession, ophthalmologists thruout the world are taking a very active part. Since 1921 several local ophthalmologic socie-

ties and clubs have arranged for graduate instruction, in connection with their meetings; and always with a most stimulating influence on the life of the association and its members.

E. J.

EMULATE THE KANSAS CITY EXAMPLE.

There is a live bunch in Kansas City. They are making their presence felt in the field of Eye, Ear, Nose and Throat. They are only beginning. What is the reason? There is a spirit of unselfish progressiveness amongst them with an utter absence of the feeling of jealousy. They have a club which welcomes any reputable specialist, in Kansas City and its immediate surroundings.

Frequent regular clinical meetings are held, to which men preeminent in some special line of ophthalmology are invited, to give an address and to hold a diagnostic or operative clinic. It keeps its members constantly on their mettle, and in the humor and enthusiastic state of mind for medical uplift and improvement.

The recent visit of Dr. Walter B. Lancaster to Kansas City and St. Louis prompted this item. His careful, conservative teaching, and skilful, precise operative technic cannot fail to make their impress on those with whom he comes in close contact. It seems to us that there should be a more ready and liberal exchange of personal ideas between leading men from different localities, so that we may be better able to appraise their real value.

Two things have enabled Kansas City to stand forth in this respect. A splendid spirit of cooperation, and the untiring energy, ability and unselfishness of Dr. Myers.

M. W.

BOOK NOTICES.

Nonsurgical Treatment of Diseases of the Mouth, Throat, Nose, Ear, and Eye. Thomas H. Odeneal, M. D., Otologist, Rhinologist, Laryngologist and Ophthalmologist to the Beverly Hospital Corporation, Beverly, Mass.; Massachusetts State Infirmary; North Reading Tuberculosis Hospital; Associate Member, Staff of The Good Samaritan Hospital, West Palm Beach, Fla. 428 pages, Octavo, with index of subjects. Published by P. Blakiston's Son & Co., 1012 Walnut Street, Philadelphia, Pennsylvania.

This book makes very satisfactory reading for the seniors and will be of material assistance to the junior specialists; and likewise to those general practitioners who will take the time to inform themselves a little more thoroly upon the relations of these head organs to the general health. The book is permeated thru and thru with the personal opinions and experience of the author, which are similar to those of the larger number of progressive practitioners.

He deals mainly with the medical treatment of diseases of the mouth, throat, nose, ear and eye, keeping in mind the relationship that local infection bears to disease of other parts of the body. However, references to the surgical treatment and preferences as to the form of operations indicated, are noted in all subjects in which surgery is indicated. While no list of references is given, yet thruout the book it will be found that the author is quite up to the year 1926 in referring to the newer forms of diagnosis and medical, physical and surgical treatment.

The list of subjects included in each chapter and in each paragraph is entirely too long to be noted in review. Careful reading of the text shows that but little has been omitted; and of this practically nothing of moment relating to the eye or its diseases or symptoms which are connected with general affections. We wonder, however, why the author failed to say anything about the treatment of tinnitus aurium or of disturbances of equilibrium; the palliative treatment of which by medication or mechanical processes gives the patient some relief. This is a handy volume; reference to which for any subject is remarkably easy, and the book is highly recommended to all practitioners of medicine.

H. V. W.

Handbuch der biologischen Arbeitsmethoden, Emil Abderhalden. Auge. Oskar Zoth, Graz, **Alfred Bielschowsky,** Breslau, **Carl Bliedung,** Hamburg. Paper, 8vo., 96 pages, 21 figures in the text. Berlin and Vienna. Urban and Schwarzenburg, 1925.

This is part 168 of Abderhalden's encyclopedic handbook of biologic methods of investigation. It is part of the fifth division of the work, which deals with methods of studying the function of single organs of the animal body. Zoth, in 14 pages, describes and compares the different methods of designating colors. Bielschowsky, in 46 pages, describes the methods of investigating binocular vision, the mechanism of ocular movements. Bliedung takes 36 pages to tell of the estimation of the blood pressure in the central artery of the retina.

The chapter by Zoth starts with the various Fraunhofer lines of the spectrum, and the wave lengths to which they correspond as measured in multiples of the mille-micron, $\mu\,\mu$, the millionth part of a millimeter. It mentions various systems of identifying colors, giving most space to those of Chevreul and Ostwald. There is a table of the different names given to the spectral colors, by Newton, Helmholtz, Hering and others, with their respective wave lengths; and a table of the names for colors in German, English, French and Italian. It should be noted that part 41 by von Hess, was devoted to methods of investigating the light and color sense.

Bielschowsky has given a rather condensed résumé of most of the practical methods of studying binocular vision and movements, with illustrations of the instruments used. The account seems fairly complete, except that the Maddox rod receives but little attention, and the diploscope of Remy and its modifications do not appear to have been considered. The absence of any table of contents, or index, makes it hard to say that in the 46 pages of the chapter there is absolutely no allusion to them. Probably the American interest in the ocular movements is better reflected in the writings of Bielschowsky than in those of any other European writer. Of course the operative treatment of squint is quite outside the scope of this work.

Bliedung begins his chapter with a survey of the relations of his subject, and an account of the tonometer of Schiötz. This he follows with a résumé of the work of Bailliart, and the suggestions of others regarding the blood pressure in the retinal arteries. The results obtained from manometric readings are compared with the indications of the tonometer. There are also comparisons of blood pressure in the brachial and central retinal arteries, and the arterioles; and also between the central retinal artery and the choroidal vessels.

E. J.

Deutschen Ophthalmologischen Geselleschaft. Fifty-fourth Meeting in Heidelberg, 1925. Edited by the Secretary, A. Wagenmann. Paper, large octavo, 388 pages, 84 illustrations (19 in colors), 40 graphs and 16 tables in the text. Munich, J. F. Bergemann.

This volume contains 48 papers read at 4 scientific sessions; and 22 communications (generally shorter) given at the demonstration session. The subjects of all of these will be found in their appropriate lists under Current Literature; and abstracts of the more novel and important will appear in our abstract department. The illustrations in colors are not printed on separate plates but are scattered thru the text of the articles which they illustrate. The whole volume is printed on very "highly finished" paper—having a very smooth and shiny surface.

The German Ophthalmological Society has 815 members, of whom 675 live in Germany and in German Speaking Countries; and 140 in countries speaking other languages, who come from almost every civilized country in the world. There are 22 in the United States. Of the 204 members present at this meeting 8 were from the United States, the largest attendance at Heidelberg from America since the Great War. The first and last sessions were presided over by Prof. Uhthoff, of Breslau. For the others the presiding officers were: Prof. Howe of Buffalo, Prof. Meller of Vienna, Dr. Jung of

Cologne, and Dr. Seidel of Heidelberg.

The fact that 70 communications were presented to 5 sessions indicates that all are short. They occupy 290 pages, an average of 4.3 pages for each paper and the discussion upon it. Evidently there was little time for discussions, most of the papers are followed by no discussion at all, or by remarks of only one or two speakers. The longest discussion, 6 pages, followed 5 papers on intraocular tension. It was participated in by 13 speakers.

The German Ophthalmological Congress, if we judge by this record of its proceedings, has fully recovered from the depression due to the Great War. The most striking evidence of this is furnished in the fine colored illustrations used for three of the papers; one on lichen of the conjunctiva, by Wick; another on lipoids in the tissue of the eye, by Jess; and the third by Schmelzer on microchemic reactions in the ciliary epithelium.

E. J.

CORRESPONDENCE.

"Oil Injections in Treating Lacrimal Duct Stenosis."

To the Editor:

Under the above heading G. M. McBean describes in the February number of the A. J. O. a method of treating lacrimal stenosis by the injection of albolin into the duct. That such a practice may be followed by very unpleasant results was shown in the following case.

In July Miss B. consulted me about a swollen and discolored condition of the tissues of the lids of the left eye, which she said appeared after some treatment for an obstructed tear duct. There was a smooth firm swelling, involving almost all of the lower left lid, and a similar appearance in the outer half of the left upper lid. The disfigurement was not extreme but it was noticeable and was the cause of much distress to the patient. In a short time the swelling assumed a slightly bluish tint and later (Sept. 1923) a decidedly yellow color, and apparently increased in size. The physician who had treated her wrote me as follows:

"On January the first, last, Miss B. was referred to me for marked epiphora of both eyes, which had existed for the past four years. After local anesthesia I succeeded in dilating the puncta and passing a one and two Bowman's probe to the sac. After this a saline irrigation was used and the solution ran thru the nose freely. On the second visit the same treatment was made, plus lubricating the tracts with a few drops of liquid albolin, the same making its appearance and dripping from the nose as did the saline.

On the fourth day of January, at the third visit, I found the patient much improved, and the same treatment as on the second day was repeated. At this time the solutions passed thru the right punctum, when only a small portion came thru the nose. There was no swelling noticed until the tissues were released at the malar process where they had been fixed as is usual.

On noting a swelling in the lower lid compression was made and later massage in the direction of the infiltrating point, hoping that any fluid might be removed thru the point of entrance, but in this we failed. Hot compresses were also tried without result. No hemorrhages of importance were seen; only a small drop of blood at the punctum and there was very little discoloration of the tissues.

I suggested aspiration and even opening up the tissue for removal but decided to wait for a time hoping that it might absorb.

The treatment was continued for a dozen times after this and at no time did such an accident happen again, the tearing continued to lessen and now she has dry eyes."

The patient subsequently underwent seven or eight rather extensive operations for the correction of her trouble, the first to remove the "paraffinoma" and the others to overcome the deformity caused by the injection and the attempts to remove the mass. Her final condition is not cosmetically perfect.

The possibility of such a result should be borne in mind by those who are inclined to try the injection of al-

bolin or similar substances into the tear passages.

Respectfully,

E. C. ELLETT.

Memphis, Tenn.

Righthandedness and Lefthandedness.

TO THE EDITOR:—Will you pardon my troubling you with a matter that has caused me some perplexity and will you try to set me straight regarding a question in ophthalmologic literature? I am either entirely at sea regarding the status of a certain scientific question or I am unable to comprehend what appears to be perfectly clear English language. As the columns of the JOURNAL are, I believe, open to correspondents, I would like to submit this matter to you personally for an opinion or, thru you, to the readers of the JOURNAL for further information.

The *Literary Digest* for December 5, 1925, contained a medical item taken from the *British Medical Journal*, dealing with the subject of "Handedness and Eyedness" and constituted a review of a recent book on that subject by B. S. Parson. As I read the *Digest* article my mind naturally reverted to several publications of the late George M. Gould, and I found myself wondering what Parson had discovered that might be new on this very interesting topic. If there was anything new in his book it was certainly not indicated in the review under consideration, for that presented almost the identical language of Gould, as I recalled it.

Early in the new year I had an opportunity to read Parson's book and the deeper I delved into it the more closely it appeared to resemble the familiar propositions and arguments of Dr. Gould. Professor Jordan, in his foreword to Parson's book, opens with the statement: "The phenomenon of bilateral manual asymmetry is of such universal interest and importance that any new light on its cause or significance is extremely welcome. This latest book on the subject, the product of a rigid scientific procedure, presents a novel method for the detection of the condition of lefthandedness, and takes us a considerable step forward in our understanding and control of this age-long enigma." And then, in his concluding paragraph says: "The present work indicates a new method of attack. Its originality inheres in the discovery of the phenomenon of 'unilateral sighting' in binocular vision and in the demonstration of a definite correlation, possibly causal, between the dominant eye and the favored hand Enlargement of view, novel approach, wider correlations—all these are here supplied.

After reading Parson's book and failing to find anything new except the description of a new instrument—the manuscope—I became sufficiently interested to take this book, "Lefthandedness", and Dr. Gould's book, "Righthandedness and Lefthandedness", to compare them critically in detail. Now, if there is anything new, except the instrument referred to, in Parson's book, I have failed to find it.

Under the heavy pressure of work, I have been unable to keep strictly up to the minute with current ophthalmic literature, and it is only within the present month that I have found time to read the December JOURNAL OF OPHTHALMOLOGY. Judge my surprise to find there Dr. Mills' article on the subject of eyedness and handedness, and to note that he seems to credit Parson with the honors of a discovery and to ignore Gould's writings, save for mention in connection with one of the least important elements of the problem.

I confess that I am confused. Before me is Gould's book, published in 1908, and containing, if I am capable of understanding it, every theory and every argument that now appears in Parson's book, published in 1924, and the latter is being proclaimed as presenting new discoveries while the former is almost entirely ignored. Do I misunderstand the situation or is the labor of a scientific worker so quickly forgotten? Does Parson's new book present new theories or new proof of old theories; and, if so, in what does this new material consist? Will you or some of your readers please enlighten me?

Sincerely yours,

HENRY O. REIK.

Atlantic City, N. J.

ABSTRACT DEPARTMENT

Reprints and journal articles to be abstracted should be sent to Dr. Lawrence T. Post, 520 Metropolitan Building, St. Louis, Mo. Only important papers will be used in this department, others of interest will be noticed in the Ophthalmic Year Book.

Cases of Cysticercus. Government Ophthalmic Hospital, Madras, Report, 1924.

Multiple cysticercus of brain. A boy, age 13, shepherd, had lost his vision a month previously after severe headache on and off for five months. The patient had vomiting, giddiness and a bad headache for the past month with shivering attacks and fever. The history seemed definite that there was sudden loss of vision. There was intense neuroretinitis, both eyes, and optic disc swollen, plus 2 D. each eye. Wassermann test was negative. There was a mass of exudate at the macula definitely a neuroretinitis, not a papilledema.

Blood pictures: Polys 70%, Eosin, 3%, Lymphocytes 25%, Mononuclears 2%. Neither albumin nor sugar were present in the urine and there were no parasites in the blood. The patient complained of bad pain in the nape of his neck. He could recognize objects by feel, and his senses other than visual seemed active. His reflexes were normal and he responded to questions clearly. The respiratory and circulatory systems were sound. The patient died and the postmortem examination showed that the brain was extensively involved with multiple cysts of the cysticercus cellulosa. These varied from the size of a pea to that of a cherry and contained greenish yellow pus. No bacteria were found in the pus. There was injection and inflammation of the meninges, evidently due to irritation set up by the parasites. Large numbers of cysts were found both in the white as well as in the gray matter of the cerebrum and the cerebellum, but more so in the gray matter. An adult tapeworm removed from the intestines at the postmortem proved to be tenia solium.

Hyatid cyst of orbit. A., Hindu, age 25, came to hospital with a proptosed eye and panophthalmitis. The proptosis was said to be of four months duration. An orbital cyst situated between the muscle cone and periosteum in the inferior temporal quadrant of the orbit was carefully removed at the same time as the eye. The milky fluid contents contained neither daughter cysts, scoleces nor hooklets.

A., Hindu, age 30, was admitted for panophthalmitis right eye. History unreliable. After evisceration a rounded soft mass was felt in the orbit. On further investigation a cyst was found at the "back of the orbit" (position not recorded with reference to the muscle cone). The cyst burst during removal and a milk fluid escaped. No daughter cysts were present. It was laminated, of the echinococcus type, about the size of a medium walnut, but no scoleces or hooklets could be found.

These last two cases were presumably sterile hydatid cysts.

Cysticercus in the pupil. A small inflammatory cyst filled the pupil and abutted against the cornea. A tiny hypopion was present; the anterior chamber was otherwise clear. The little cyst seemed to be made up of an inflammatory exudate, and at first it was considered to be a hernia of exudate into the anterior chamber pushed forward by aqueous from the posterior chamber. Examination with the corneal microscope provided no further information. A keratome incision was made at the limbus in the inferior temporal quadrant. On inserting an iris repositor, the whole cyst detached from the pupil and was washed thru the incision. It was then recognized as parasitic and accordingly placed in a watch glass of warm saline. A few moments afterwards a small bladder worm emerged from its sheath of cellular exudate. In a short time this little cysticercus, which was about 5 mm. x 3 mm. protruded its head and for some time it was watched under the binocular microscope making movements of the rostellum. On one occasion a definite wave of constriction passed along the bladder. Whilst waiting for fixative to be prepared, the

head became invaginated tortoise fashion and would not come out again. It would have been better to have paralised the worm with cocain while the head was still out and subsequently fixed it in saline formalin. Possibly the head might have protruded again had a very dilute acid solution been used, but numbers of other expedients which were tried failed to cause evagination.

E. J.

Wright, R. E., and Taylor, C. G. Acute Infection of the Orbit. Indian Medical Gazette, 1925, vol. 60, p. 312.

Localized cellulitis with abscess. A man, age 20, was admitted with cellulitis of the orbit. A white spot on the cornea was treated by subconjunctival injections. A few hours after the twelfth injection the eye became swollen, protruded and very painful. For several days the eye was treated, and on the sixth day the doctor performed an exploratory operation, but no pus was found. On the eighth day the patient was admitted to this hospital and exploration in the superior nasal quadrant revealed pus on the inner side far back. Exposed bone was felt near the apex of the orbit. Free drainage was effected, but eventually the eye was lost and had to be removed. The chief point of interest about this case is that cellulitis supervened on subconjunctival medication.

Diffuse cellulitis of orbit. A female, age 16, was admitted with marked swelling, proptosis and chemosis of the right eye, and a history of having scratched a pimple on the tip of the nose five days before. There was marked swelling and pain with a bulging forward of the eye and an inability to close the lids. The conjunctiva was incised by a practitioner. Next day the patient was brought to hospital and under chloroform the orbit was carefully explored with a needle. There was exposed bone in the superior nasal quadrant, but no pus. A free incision was made in the superior nasal quadrant, and external canthotomy was performed. The temperature at this time was very high and had to be controlled by ice packs; the patient had great pain and was delirious. On 8th of June, 1924, the temperature was still keeping about 104° and there was marked swelling at the right side of the neck in parotid region. It was decided to explore the outer aspect of the orbit, and a curved incision parallel to the orbital rim was made down to the periosteum which was then elevated from the outer wall. The outer wall was removed, the sphenomaxillary fissure and the pterygoid region exposed. No pus was found, but there was considerable reduction in tension and on the 10th the patient's condition was slightly better. At this time it was found that there was marked swelling of the right tonsil, soft palate and the pillars of the fauces. Breathing was obstructed, so the upper part of the tonsillar region was incised and the enormously distended uvula removed. No pus was encountered. On June 13, 1924, the patient received antistreptococcus serum and she showed distinct improvement on the 14th and 15th. On the 16th, the temperature rose again to 105°. Antistreptococcus serum was exhibited on the following day and the patient treated by ice packs and cold sponging. On the 18th day the temperature fell and continued to drop steadily until it came to normal about the 28th of the month. Meantime the globe itself had become infected thru the corneal ulcer and the eye was eviscerated when the patient's temperature had come to normal.

Cavernous sinus thrombosis. A., Hindu, male, age 22, admitted on October 21, 1924, with high temperature, slight delirium, and marked swelling of the subcutaneous tissues about the right orbit, more particularly over the glabella, where the skin was raised and fluctuating. Two or three small openings exuded pus near the tip of the nose and pus came from the right nostril. There was slight proptosis. The veins of the sclera and conjunctiva were engorged and the supraorbital vein was full. An incision was made along the middle line of the nose down to the bone which was rough, the periosteum having been raised by pus. The incision was carried round the orbital rim in the brow, and the inner wall of the orbit was explored and pus

found. Ophthalmoscopic examination of the right eye was impossible owing to the exposure ulcer. Examination of the left eye showed slight redness of the disc, no edema. The pupils were active to light and inclined to be contracted; temperature 104°, pulse very rapid. The following morning there was definite fullness of the subcutaneous tissues on the left, but no proptosis of the globe. The patient continued to sink and died at 5:40 p. m. on October 23, 1924.

Postmortem appearances: There was suppurative ethmoidal sinusitis, purulent infiltration of the orbit with thrombophlebitis. The cerebral veins were markedly congested and the brain was edematous. There was a large area of purulent exudate beneath the membranes over the temporo-sphenoidal lobe. Considerable quantity of greenish pus lay round the infundibulum. The cavernous sinuses were filled with pus and clots. The infective process had extended into the Rolandic area and also back beneath the tentorium and up towards the posterior region of the cerebrum on the right side. The left was not so extensively involved. The organisms found in smears from the exudate were staphylococci and pneumococci.

This is the third year in succession in which one death had been due to cavernous sinus thrombosis. The case in 1922, not reported in detail, is interesting inasmuch as it originated in a stye.

Discussion on Miners' Nystagmus before the Royal Society of Medicine, Feb. 13, 1925. British J. Ophth., 1925, Nov.

Llewellyn states that 25 per cent of all men employed underground have signs of Miners' Nystagmus. There is no evidence of an increase in this percentage but since compensation was established in 1908, the stress of war and a better definition of the disease, the certified cases have greatly increased. Average duration underground before failure is 26 years. Eighty-one per cent of the cases are among men working at the coal face.

The essential factor in the production of the disease is deficient illumination. This is due to the use of low candle power lamps, the distance at which the lamp is placed, shadows and absorption by the coal and dust of 90 per cent of the incident light.

Improvements in illumination are obtained by increasing the candle power, bringing the lamp nearer the working area, shadowless lamp, altering the reflecting power of working places, proper lamp maintenance and the use of tinted glasses. Ill health, fear of unemployment, poor wages and labor unrest are factors which influence the onset of incapacity. Suitable employment has an important influence on the recovery rate. If a nystagmic man be kept idle he rapidly deteriorates, but if encouraged to work above ground the recovery rate is high.

Haldane stated that Miners' Nystagmus is brought about by using the eyes for guidance of muscular movement where absolute differences in luminosity of the object seen are extremely low. With low luminosity, foveal vision looses completely its lasting character. An object at first seen, fades rapidly out of consciousness so that it can no longer be fixed, with the result that the eye wanders, picking the object up momentarily and losing it again. The illumination required to prevent nystagmus must be such as will permit of lasting foveal vision. This fixation is necessary for the proper guidance of any tool a miner is using. It is the experience of the writer that the action of abnormal gases can have nothing whatever to do with the condition.

Elworthy referred to the small amount of light a coal miner had to work with because of the absence of color in coal. The general blackness of the field absorbs from 90 to 97 per cent of the light so that only 3 to 7 per cent is reflected back. Blue and violet lights are the most irritating. Exhaustion or injury of the retina by violet light seems to offer an explanation of the movements of the eye in nystagmus. Candles, oil lamps and carbon filament lamps afford the greatest comfort. The cost of coloring the coal face being prohibitive, carbon filament lamp or a lamp with a yellow tint to filter out the excess of blue is highly desirable.

Mitton was satisfied on two points as causative factors, insufficient light and difference in idiosyncrasy of the men engaged in mining underground. By means of a table he shows the lessened incidence due to illumination improvement which has taken place in the eight collieries employing seven thousand men under his supervision. In 1913 the incidence was .95; at the end of December, 1924, it was .56.

Culpin expressed the belief that the condition was a psychoneurosis which is correlated with bad illumination and indirectly with the presence of danger. This covers more of the facts observed than does any other theory.

Harford has observed that the most powerful factors in the causation of this disease are emotion and fear. These emotions are not always recognized by the individuals. The inhibition of the desire to get well is determined by the lure of a pension. We are all prone to ascribe our ills to our surroundings.

Sack pointed out the difficulty in producing an electric lamp giving more light owing to the limitation in weight a miner agrees to carry (5/6 lbs.). Euphos glass gives better visibility but the claim that it reduces glare cannot be substantiated. Frost bulbs would be more effective.

Robson discussed the chemical relationship of coal to the neurologic defects in the miner. The class of coal in which nystagmus is more evident is bituminous. Coals of the bituminous type have the highest proportion of volatile matter which is the index of a coal complex that gives rise to the highest incidence. The author goes extensively into coal chemistry.

Graham discussed in detail the heating of coal due to oxidation and the varying character of different coal pits. Some of the writers' conclusions are that bituminous, self heating coal giving rise to carbon monoxid; high volatile percentage coal, old pits, pits in which explosives are used, poor ventilation and deep pits have the highest incidence. Alleged neurasthenic symptoms are indications of a disturbed nervous system of central origin equally with those of the eye muscles, from toxins in the pits, and are not a separate disease. Poor illumination is not a primary cause tho possibly auxiliary, but is a toxemia or an anoxemia due to oxygen want in the central nervous system.

Collis stated compensation records are a fallacious index of the increase of the disease. The disease should be looked upon as an occupational neurosis.

Enough has been said to indicate the care necessary before accepting compensation claims as evidence of any increase or decrease of the disease. The utmost the records indicate is that miners' nystagmus does exist, and that, when the economic life of the mining industry is unhealthy, the psychology of those employed becomes unhealthy; then a certain number of latent cases from the potential reserve becomes manifest. Far the most important matter is the ever increasing number of old claims based on neurasthenic symptoms with no accompanying oscillation of the eyeballs. The only hope for them is treatment for neurasthenia. It is not nystagmus, which readily reacts to treatment; it is neurasthenia, which is of urgent importance.

Pooley referred to the personal factor in the observer and that in the person observed. With the former, some men have preconceived theories where they attempt to search for facts with which to support it. With the latter, many men can do their work in spite of having a marked degree of oscillation. Failing health, disinclination to work, shortage of work and compensation affording more money are substantial reasons for men to give up. D. F. H.

Zachariah, G. Epithelioma of Orbit in a Young Boy. Government Ophthalmic Hospital, Madras, Report, 1924.

A Hindu boy, age 9, was admitted with a fungating growth of the left eye. A large cauliflower like mass projected between the lids. It was hard and avascular and not suggestive of glioma. The other eye was in a condition of phthisis bulbi following ulceration of the cornea. The child had been in this hospital in 1918 for ulcer

of the right cornea and staphyloma of the left, cause not recorded, but not the result of smallpox. A small fragment of the growth was removed and found to be epitheliomatous. Exenteration of the orbit was carried out. On examining the gross specimen it was found that a hard growth formed a massive collar round the anterior rim of the sclerotic extending over the rim and dipping into the globe. The posterior part of the orbit was not infiltrated; the growth had invaded the fornices above and below, so that the lid margins were everywhere in contact with the growth. The boy presented a curious appearance of brown and white mottling on a light brown skin. The brown spots in many places showed overgrowth of epithelium and were slightly raised so as to be rough to the feel. There was also scaling atrophy of the skin. This was particularly marked round the nose and on the lip. Several large brown elevated freckles were seen on the lower lip and the mucous surface was chapped and scarred. The freckles did not extend on to the conjunctiva, but the lid margins showed atrophic changes. Mottling was not only due to freckles, but also to the pale spots which looked like small leucodermic areas. The condition is probably similar to that described by Hutchinson as lentigo maligna juvenilis. Other members of the family showed nothing abnormal.

A microphotograph of the growth is appended, and a photograph of the face showing the freckles and atrophic spots. The latter shows recurrence on the temporal side just inside the rim of the orbit a few weeks after operation.

E. J.

Eyelash in Anterior Chamber. Government Ophthalmic Hospital, Madras, Report, 1924.

A man, age 20, sustained an injury to his left eye a few days before while riveting. A comparatively large piece of iron struck the eye and fell away. He was treated in the Out-patient department for several days before it was discovered that an eyelash lay in the anterior chamber right across the pupil. On careful examination it was found that there was a small triangular corneal scar near the periphery of the cornea about 10 o'clock and a hole in the iris in a corresponding position, but at a slightly lower level. Another scar was visible in the cornea near the periphery about 2 o'clock, but no corresponding tear in the iris. The hair lay with its root in the angle of the anterior chamber about 4 o'clock and its tip under the pupillary edge almost opposite, and was densely coated with pigment. With the corneal microscope there did not appear to be any evidence of a lenticular trauma. A keratome incision was made just outside the limbus about 4 o'clock, the hair seized with an iris forceps and withdrawn. R.V. = 6/5; L.V. = 6/7. The lens appeared clear but there were some fine pigment deposits on the anterior capsule as seen with the corneal microscope.

E. J.

Effects of Methyl Alcohol on the Optic Nerve. Government Ophthalmic Hospital, Madras, Report, 1924.

A Hindu boy, age 18, admitted 5th of June, 1924, had taken about three ounces of methylated spirit mixed with water on the evening of the 3rd and again at noon June 4th. That evening by about 7 p. m. he was completely blind. On admission there was no perception of light in either eye. The fundus examination showed that the discs on both sides were somewhat hyperemic and swollen. The temporal edges were sharp, but the nasal edges hazy and obscured, merging with the surrounding retina which was pale and edematous. There was about 5 D. of swelling. Both arteries and veins were engorged and the finer twigs everywhere tortuous. The remainder of the fundus showed no gross changes. The patient was kept under observation and gradually the edema of the disc and retina subsided. The disc became more uniformly salmon pink in color and the vessels settled down to about normal calibre. By the 7th of July, a month after admission, V. = R. 6/24; L. 6/6. July 11th, it was obvious that cicatricial changes were becoming established. The vision was R. 6/18; L. 6/6.

Streptothrix of the Canaliculus. Government Ophthalmic Hospital, Madras, Report, 1924.

A Hindu was admitted for scleritis of the left eye. He also had lacrimation in the right eye, redness of the conjunctiva and a discharge of pus from the canaliculi. The inferior canaliculus was red and distended and the punctum prominent and pouting. There was a yellow cheesy material in the canaliculus which could be broken up and squeezed out. The patient was syphilitic and had sugar in the urine. Smears from the canaliculus showed the presence of streptothrix. Inoculation was made into different media. A streptothrix was isolated which was nonpathogenic to guinea pigs, rabbits and pigeons.

Parinaud's Syndrome. Government Ophthalmic Hospital, Madras, Report, 1924.

A man, age 32, showed a condition of the conjunctiva not unlike tuberculosis. There was a definite history of trauma, no evidence of animal contact, constitutional symptoms were insignificant. Only the preauricular gland was swollen and it subsided after three months. The local lesion showed large coarse polypoid granulations with grayish yellow areas, without ulceration. The granulations eventually invaded the cornea and destroyed it. Animal experiments and cultural experiments were negative. Antisyphilitic treatment with novarsenobillon, mercury, and potassium iodid, X-ray treatment, and antituberculous treatment all proved of no avail. The only case met with here of recent years closely resembling the above was one of conjunctival tuberculosis verified by microscopic examination. Professor Verhoeff furnished, for inspection, a section showing the leptothrix conjunctivae described by him. He considered that the appearance in a section sent to him did not at all resemble those met with in the type of case which he has described as due to leptothrix conjunctivae. E. J.

Optic Atrophy with Binasal Hemianopsia. Government Ophthalmic Hospital, Madras, Report, 1924.

A male, age 47, was admitted November, 1923, with a history of failing sight since 1921. He had syphilis in 1901, for which he was treated with mercury. R.E.V. = F at 3″ centrally. L.E.V. = F at 2½ meters N.I.G.

The pupils were sluggish to light and accommodation; the tension was normal in both eyes. Ophthalmoscopic examination showed simple optic atrophy in the right eye with the lamina showing and the arteries slightly narrowed. In the left eye the condition was similar. The fields showed binasal hemianopsia. On the left side below a vertical line of demarcation continued in a half circle round the fixation point on the 7° circle and shelved off to the temporal side above, the bulk of the field being included in the 55° circle. The right field showed a similar condition, but the line of demarcation deviated 15° towards the temporal side of the middle line above and below. In each case a 10 mm. white object was used at 33 cm. An X-ray revealed nothing abnormal in the skull. The pituitary fossa and sinuses appeared normal. The Wassermann reaction was strongly positive. The urine was normal, as was also the sugar tolerance. Blood pressure was 130 systolic, 90 diastolic. A note by Col. Elwes, 1st physician, General Hospital, says: "The motor system thruout is practically normal, also the sensory system.

"Reflexes both superficial and deep are generally speaking normal, but there is a slight exaggeration of both knee jerks. There is no trace of incoordination, anesthesia or hyperesthesia." The patient was put on prolonged antisyphilitic treatment, but the vision gradually deteriorated.

E. J.

Wright, R. E. Optic Atrophy Due to Syphilis Without Nervous System Disease. Government Ophthalmic Hospital, Madras, Report, 1924.

During the routine collection of notes on the various types of optic nerve diseases in the past few years, it was remarked in cases of simple optic atrophy associated with syphilis how infrequently other manifestations of central nervous system disease were noted. At first it was supposed that some of these might be tabes cases in which the usual clinical evidences were

hard to find and hence had escaped our observation. On this account such cases as presented the combination of simple optic atrophy and syphilis were very carefully investigated in order to avoid missing obscure signs or symptoms of central nervous system disease. A number of cases have been separated from the general group of simple atrophies, in which beyond an atrophy of the optic nerve and occasionally an exaggeration of the knee jerk, there were not other detectable abnormalities of the central nervous system. Eight cases were very carefully investigated. In all these syphilis was definitely proved and they were submitted to careful clinical examination by physicians who furnished full reports on the condition of the nervous system. The details need not be published here as the findings were for the most part negative. Col. Elwes, I.M.S., and Major Skinner, I.M.S., kindly undertook the examinations referred to and full notes of the cases were collected in detail by members of my staff. As mentioned above, certain of these cases showed, in addition to the simple atrophy of the optic nerve, an exaggeration of the knee jerk on one or both sides. This is apparently not a constant association, but is met with sufficiently frequently to be remarkable. Two cases of binasal hemianopsia might also be included in this group, making ten in all. It may be mentioned that we have not had a single case of locomotor ataxia during the year and the infrequency of the condition is noteworthy. In last year's report it was stated that in the analysis of optic nerve diseases from 1919 to 1922 there were five cases of tabes met with in which simple optic atrophy was present. The consideration of this subject gives the impression that probably the commonest cause of simple optic atrophy with which we have to deal is that associated with syphilis without other obvious signs or symptoms of central nervous system disease, except perhaps abnormality of the knee jerk.

E. J.

Neame, H. and Wolff, E. Endothelioma of the Optic Nerve. Brit. J. Ophth., 1925, vol. ix, No. 12.

The authors report a case in a man aged 27 years. The eyeball had been growing more prominent during the preceding six years. In addition to a papilledema of 3-4 D. there was some scattered black pigment down and out from the disc. This was probably due to interference with the short ciliary arteries. An attempt at excision failing, the eye and growth were removed as one. A minute macroscopic and microscopic report accompanies the contribution together with three clinical illustrations and five microphotographs.

The growth described is a typical endothelioma. There is some evidence suggestive of the presence of a thin layer of growth which lies between the dural and pial sheaths on the nasal side of the nerve and that this layer of growth, wrapped around the nerve superficial to its pial sheath, much thicker on the temporal side, has on that side grown more rapidly and spread more freely into and thru the dural sheath. On the other hand, it may quite well be stated that the growth arose as an extradural endothelioma, or from lymph channels in the dural sheath, and that it extended inwards into the subdural space. The subdural space is a recognized source of endothelioma of the optic nerve. It is possible, therefore, that the growth in this case originated from the endothelium of the subdural space.

D. F. H.

Sun Injury of the Macula. Government Ophthalmic Hospital, Madras, Report, 1924.

A male, age 40, surveyor, was admitted because in the right eye vision had been gradually failing for three years. R.E.V. = 6/12 N.I.S., L.E.V. = 6/5 bar 3 1s. B.E. pupils active, fields of vision normal, no central scotoma. Ophthalmoscopic examination: The left fundus was within normal limits. On the right side there was an appearance at the macula such as is usually seen in "sun gazing" cases. The fovea was represented by a small sharply outlined area of maroon color. The appearances with the ophthalmoscope were so suggestive of the "sun gazers" macula described by Col. Kirkpatrick that the patient was closely questioned as to whether he looked at

the sun during prayer, or had viewed an eclipse. After some time, he volunteered the information that part of his instruction as a surveyor included looking at a heliotrope (the instrument for reflecting the sun in signaling) thru a theodolite. This is the first case of its type met with here, but it is quite likely others may be collected, as apparently in survey instruction courses the practice described above is sometimes followed. E. J.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply news from their respective sections: Dr. H. Alexander Brown, San Francisco; Dr. Wm Thornwall Davis, Washington; Dr. Gaylord C. Hall, Louisville, Ky.; Dr. George F. Keiper, LaFayette, Indiana; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. George H. Kress, Los Angeles; Dr. Edward D. LeCompte Salt Lake City; Dr. W. H. Lowell, Boston; Dr. G. Oram Ring, Philadelphia; Dr. Charles P. Small, Chicago; Dr. G. McD. VanPoole, Honolulu.

DEATHS.

Dr. Benjamin L. W. Floyd, Evansville, Ind., died suddenly January 27, aged 55.

John Jacob Bausch, founder and president of the Bausch & Lomb Optical Company, died at his home in Rochester, N. Y., February 14, at the age of 95 years.

Dr. Joseph O. Stillson, Indianapolis, formerly Professor of Ophthalmology and Oto-Laryngology, Central College of Physicians and Surgeons, Indianapolis, died January 28, 1926, of lobar pneumonia, aged 75.

Dr. G. A. Herman Kellner died January 28, 1926. He graduated at the University of Jena in 1889 and became interested in scientific optics, especially as applied in the microscope. He also aided in the development of motion picture projection apparatus and other scientific instruments. He was the organizer and for twenty years the head of the Scientific Bureau of the Bausch & Lomb Optical Company.

SOCIETIES.

At the meeting of the staff of the Delaware Hospital, Wilmington, Del., January 12, Dr. W. O. LaMotte was elected president.

Dr. Edwin J. Gardiner has been elected president of the Chicago Ophthalmological Society; Dr. Dwight C. Orcutt, vice president; and Dr. Robert H. Buck, secretary-treasurer.

Dr. Walter Lancaster, Boston, conducted an operative clinic at St. Mary's Hospital, St. Louis, January 23, and was entertained at dinner by the ophthalmic section of the St. Louis Medical Society in the evening.

Officers elected at a recent meeting of the New York Ophthalmological Society for 1926 are as follows: President, Dr. John M. Wheeler; vice president, D. F. W. Shine; secretary and treasurer, Dr. John H. Dunnington.

The Louisville Eye and Ear Society elected the following officers for the year 1926: President, Dr. Adolph O. Pfingst; vice president, Dr. M. C. Baker; secretary-treasurer, Dr. C. C. Maupin.

Dr. Frank E. Chase, Seattle, has been elected president of the Puget Sound Academy of Ophthalmology and Oto-Laryngology; Drs. John A. Johnson, Tacoma, and Spencer S. Howe, Bellingham, vice presidents; and Dr. Morrille J. Morris, Seattle, secretary-treasurer.

At the annual meeting of the Louisville Eye and Ear Society, January 16, the guest of honor was Dr. J. J. Shea of Memphis, who addressed the society on "Sinus Diseases in Childhood with Observations on the Development of the Sinuses After Infection." A large attendance of the local profession was present as well as many from out in the state. The address was greatly enjoyed by all.

At a well attended and enthusiastic meeting of the Ophthalmological and Oto-Laryngological Section of the Cleveland Academy of Medicine held January 22, the subject of vertigo was taken up. The symposium proved a most interesting and instructive one and elicited a great deal of valuable discussion. Those participating in the symposium were Dr. F. C. Oldenburg, who gave the viewpoint of the internist; Dr. C. W. Stone, who reviewed the subject from the neurologic standpoint; Dr. C. E. Pitkin brought out the views of the aurist; and Dr. R. B. Metz those of the ophthalmologist.

The program of the section of ophthalmology of the College of Physicians of Philadelphia, February 18: Dr. Frederick Krauss, "A Simplified Method for Complete Enucleation"; Dr. G. E. de Schweinitz and Dr. A. G. Fewell, "A Clinical Communication on Tobacco Amblyopia and Diabetes"; Dr. G. E. de Schweinitz and Dr. B. F. Baer, Jr., "Long-Continued Use of Myotics in Controlling Ocular Tension, and Some Remarks with Reference to the Best Methods of Preparing Solutions of Myotics"; Dr. L. Waller Deichler and Dr. A. Barlow, by invitation, "Some Interesting Changes in the Vessels of the Fundus"; Dr. T. B. Holloway, "A Case of Excessive Fundus Vascular Changes."

PERSONALS.

Dr. Charles J. Coffey has been elected president of the Milwaukee Oto-Ophthalmic Society.

Dr. Thomas F. Staley, Bristol, Tenn., is enjoying a short visit in the Hawaiian Islands.

Dr. M. W. Jacoby announces that he is now associated with Dr. W. E. Shackelton of Cleveland, Ohio.

Dr. Thomas J. Williams was made head of the department of ophthalmology at the American Hospital of Chicago.

In France the following appointments of ophthalmologists have been announced: Cantonnet, Hospital Beaujou; Magitot, Hospital Tenon; Monthus, Hospital Laennec.

Dr. M. Paul Motto of Cleveland, Ohio, was recently appointed Associate Ophthalmologist in the Ophthalmological Department of the Lakeside Hospital, and Lakeside Dispensary of the Western Reserve University of Medicine.

Dr. Allison T. Wanamaker, Seattle, is spending a much needed vacation in Honolulu and the islands of the Hawaiian group. He expresses himself as very much pleased with the climate, scenery and bathing, and hopes that this is only the beginning of many future visits.

The partnership hitherto existing between Drs. Lyster, Lewis, Jones and Ingham has been dissolved. Dr. T. C. Lyster, Dr. Isaac H. Jones and Dr. S. D. Ingham will continue to occupy offices at 1920 Wilshire Blvd., Los Angeles, Calif.; Dr. E. R. Lewis will be located at 730 South Catalina Street, Los Angeles.

VIENNA POSTGRADUATE COURSE IN OPTHALMOLOGY.

A third special course for postgraduate study in ophthalmology will be given between October 1 and December 4, 1926, at the First and Second Eye Clinic of the Allgemeines Krankenhaus, Vienna, Austria.

This intensive postgraduate instruction was first originated in Vienna in 1922 as a result of a suggestion of Prof. E. Fuchs, who was then in America. Prof. Fuchs is kind enough to participate in the program this year, and Prof. Dimmer and Prof. Meller, chiefs of the two Eye Clinics, have again consented to be active participants. The other lectures will be given by Prof. Lindner, Docent A. Fuchs and Docent Bachstez and the Assistants Dr. Guist, Dr. Pillat, Dr. Safarc, Dr. Urbanek and Dr. Sallmann. Professors, Docents and Assistants of other departments will deliver lectures in their respective department: Prof. Kreidl on Physiology of the Eye, Prof. Schüller on X-rays, Docent Hirsch on the Hypophysis, Assistant Sternberg on Embryology, Docent Luger on Herpes and Arteriosclerosis, Docent Elias on Diabetes, Docent Kollert on Kidney Diseases, Docent Kofler on the modified West operation, Assistant Kummer on Radium Treatment.

The course has been so arranged that the field can be covered in the above time in a systematic and comprehensive way. A preliminary knowledge of ophthalmology is presumed.

Concerning operations, slitlamp and skiascopy with cylinders, only lectures with demonstrations will be given. There will be an opportunity, however, for small groups of men to do practical work in these fields, in both Eye Clinics at the current fees. In ophthalmoscopy the nonelectric ophthalmoscope will be used.

The entire course will be given in English and for a minimum of ten and a maximum of fifteen men. The fee is $235 for each man. Application enclosing a certified bank check to the amount of $50 should be sent to Docent A. Fuchs, Vienna, 8 Skodagasse 13. Applications are accepted in order of priority.

The summary of the course follows:

	Hours
Prof. E. Fuchs: Special lectures	2
Prof. Dimmer:	
Photography of fundus	2
Special lectures	2
Prof. Meller: Operations	20
Prof. Kreidl: Physiology of eye	10
Prof. Lindner: Bacteriology of eye	12
Refraction	26
Skiascopy with cylinders	6
Compensation-Simulation	5
Dr. A. Fuchs: Histopathology	28
Anatomy, fundus diseases	14
External diseases	20
Dr. Bachstez: Neurology of eye	15
Disorders of muscles	15
Field of vision	6
Asst. Guist: External diseases	34
Normal Histology	7
Anatomy of the orbit	4
Asst. Pillat: Ophthalmoscopy	27
Methods of examination	14
Asst. Safarc: Ophthalmoscopy	27
Asst. Urbanek: Slitlamp	3
Asst. Sallmann: Therapy	6
Asst. Sternberg:	
Embryology of eye	4
Prof. Schüller: Röntgen rays	4
Dr. Hirsch: Hypophysis	5
Dr. Luger: Herpes	1
Arteriosclerosis	1
Dr. Kollert: Kidney diseases	1
Dr. Kofler:	
Modified West operation	1
Dr. Kummer: Radium treatment	1
Dr. Elias: Diabetes	1

MISCELLANEOUS.

The National Committee for the Prevention of Blindness has moved its headquarters to 370 Seventh Avenue, New York. Dr. William H. Wilmer and Dr. Wm. F. Snow have been elected to the board of directors. This association now has a membership of 14,000 persons.

Ophthalmologists and opticians of the Netherlands have entered into an agreement not to transgress upon the others' chosen field. The ophthalmologist will refer his patients to the optician for lenses, and the optician will refer his cases to the oculist for refraction.

Current Literature

These are the titles of papers bearing on ophthalmology. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in **heavy-faced type.** The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is an abstract of the original article. (Bibl.) mean bibliography and (Dis.) discussion published with a paper.

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